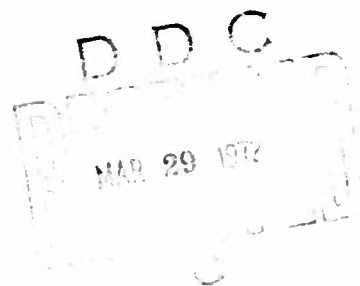


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AN ANNOTATED BIBLIOGRAPHY OF THE LITERATURE DEALING WITH THE PHYSIOLOGICAL CORRELATES OF ATTITUDES AND ATTITUDE CHANGE

Nicholas J. Carriero
Edward C. Gehringer



December 1971

HUMAN ENGINEERING LABORATORIES



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This bibliography is an annotated collection of 798 references dealing with the physiological correlates of attitudes and attitude change. The major portion of the items are from the period extending from 1949 to 1970. The items are arranged in alphabetical order by author.

PREFACE

A number of the Abstracts included in this bibliography have been reprinted from Psychological Abstracts with special permission from the American Psychological Association. Another group are abridged versions of dissertation summaries that originally appeared in the Dissertation Abstracts and appear here with the kind consent of Dissertation Abstracts, Inc. These latter items are referenced as follows in the bibliography:

Woodmansee, J. J., Jr. An evaluation of pupil response as a measure of attitude toward Negroes. (Doctoral dissertation, University of Colorado) Ann Arbor, Michigan: University Microfilms, 1965. No. 66-3299.

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We also wish to acknowledge the dedicated assistance of Mrs. Betty Morris, the HEL Librarian, whose zealous efforts in tracking down obscure and poorly identified references have materially enhanced the completeness of our coverage. In addition, we wish to thank Miss Violet J. Confer and Mrs. Thelma Ashley of the HEL Technical Reports Office for their patience in transforming a very difficult manuscript into a finished report. Finally, we wish to acknowledge our debt of gratitude to the hundreds of researchers in this area who so generously helped us in this effort both by supplying us with copies of their own research and by furnishing us with the names of other researchers working in this field.

INTRODUCTION

The aim of this bibliography was to gather together studies that link attitudes and attitude change to physiological activity in order to facilitate research in this area. In view of the many and varied definitions of "attitude" that appear in the literature, broad and liberal selection criteria were employed in choosing items for inclusion.

These broad criteria have resulted in the selection of items from such categories as the following: (1) studies relating personality traits to physiological changes (the distinction between personality trait and attitude being empirically if not theoretically blurred in many instances), (2) studies on lie detection [here the suggestion of Hinkle (1961) was followed, "'Willingness to give information' is an 'attitude', a 'mental set', an 'increased propensity of the individual to react in a given manner'...", (p. 41)], and (3) studies on the relation of psychosomatic illnesses to "life situations" and "conflicts". (These were included whenever the "life situations" and "conflicts" mentioned in the studies fit our generalized concept of attitude.)

Since, by its nature, the subject area of this bibliography focuses on the intensity or emotional component of attitude, a number of studies dealing with the physiological correlates of emotion have also been included. In addition, articles that appeared to have special methodological or procedural significance for research in this area have been incorporated.

It is hoped that the richness of viewpoint that accrues from these decisions will offset the increase in the amount of material to be dealt with.

Material for this bibliography was gathered from three main sources: (1) the Psychological Abstracts from 1949 through 1970, (2) requests to authors working in this field that asked for reprints of articles that they had published in the area and the names of other workers in the field, and (3) reference lists from the articles selected. Bibliographies from related areas were also reviewed for relevant material.

The abstracts that appear in this bibliography, in most instances, are taken directly from the summaries or abstracts of the cited articles. Some of the abstracts were taken directly from Psychological Abstracts or Dissertation Abstracts. In a few instances we have either supplied the abstracts ourselves or used appropriate sections of the articles when the above alternatives were lacking. A number of abstracts have been abridged from their original size in order to make them more suitable for the present purpose.

While an intensive effort was made to insure comprehensive coverage of the area, it is realized that relevant material has, in all probability, been left out due to either error or oversight. It would be deeply appreciated if these omissions were brought to our attention so that this defect may be remedied in future editions of this bibliography if user interest warrants such continuing coverage. Other suggestions and comments as to content and other general features (for example the utility of a cross-index) of the bibliography would also be appreciated.

Reference

- Hinkle, L. E., Jr. The physiological state of the interrogation subject as it affects brain function.
In A. D. Biderman & H. Zimmer (Eds.), The manipulation of human behavior. New York:
Wiley & Sons, 1961. Pp. 19-50.

A

1. Aarons, L. Diurnal variations of muscle action potentials and word associations related to psychological orientation. Psychophysiology, 1962, 5, 77-91.

Theoretical analysis has suggested that the feedback of neuromuscular activity affects quantitative but not qualitative aspects of responses, i.e. arousal provides energy but not direction for behavior. This study was carried out to determine whether or not qualitative aspects of ideation vary with the normal diurnal fluctuations of neuromuscular activity. Word association tests revealed qualitative differences were related to psychological test variables of kinesthetic orientation need for change, and anxiety; other differences were independent of psychological test scores but related to the time of the word tests and intensity of muscle action potential (EMG). Subjects with low and high scores on the psychological tests were similar in both body temperature variation and amount of time spent in different EEG sleep stages. EMG levels during sleep were highly correlated with EEG sleep stages for both groups, but low psychological test scorers exhibited more EMG activity than high scorers. Neuromuscular arousal was accompanied by qualitative changes in verbal responses that were related to psychological orientations.

2. Abel, T. M. Attitudes and the galvanic skin reflex. Journal of Experimental Psychology, 1930, 13, 47-60.

Our experiments have not substantiated the widespread belief that the galvanic skin reflex is an indicator of some general psychological class, as of emotions, conations or volitions. Most of the experimental work designed to support such a belief has been too gross and too conceptual to merit credence. On the positive side, our study seems to point to a fairly definite functional connection between electrical changes in the skin and certain reportable attitudes (Bewusstseinslagen) which mark sudden, decided and momentary checks in the course of the comprehension and the solution of simple problems of an elaborative sort.

3. Acker, C. W. Personality concomitants of autonomic balance; I Rorschach measures: II Inventory measures. Journal of Projective Techniques and Personality Assessment, 1963, 27, 12-22.

Part I reports on a pilot study in which the Rorschach records of 13 college males who manifested a low autonomic balance were compared with a group of 13 with a high autonomic balance. A set of quantitative values and derived scoring schedules were found to discriminate between the 2 groups. When an experimental group of 41 college males was tested only the 2 scoring schedules, Shading Use and Aversion, and Content and Organization were verified. Part II discusses a group of college males who received Wenger's autonomic balance battery of physiological tests. Within this group there were overlapping groups who gave evidence of manifest anxiety and types of neurotic control on the Freeman Manifest Anxiety and Psychosomatic Symptom scales and on Rorschach scores of (a) Shading Use and Aversion and (b) Content and Organization. None of the inventory measures were found to correlate with autonomic balance.

4. Acker, L. E., & Edwards, A. E. Transfer of vasoconstriction over a bipolar meaning dimension. Journal of Experimental Psychology, 1964, 67, 1-6.

Transfer of salivary response conditioned to the word "good" to sentences which appeared to vary in meaning from good to bad has been recently reported. This phenomenon was replicated and extended by conditioning (24 Ss) vasoconstriction to the words "good" or "bad" testing for transfer on words previously rated by S on the evaluative scale of the semantic differential, and either instructing or not instructing Ss to covertly evaluate the test words. Transfer of vasoconstriction ($p < .001$) was demonstrated, but the semantic differential ratings were not significantly changed by the differential conditioning. It was concluded that transfer, as predicted by a mediation model, was demonstrated.

5. Adams, N. M. Changes in pupil size under conditions of anxiety and stress. (Doctoral dissertation, George Washington University) Ann Arbor, Mich: University Microfilms, 1968. No. 69-687.

Twenty white male university students, designated high anxious on the basis of scores on the I.P.A.T. Anxiety Scale, and twenty white male university students, designated low anxious on the basis of scores on the I.P.A.T. Anxiety Scale, were exposed to auditory stimuli, defined as stressful, while measures of change in pupil size were recorded on film. The order of presentation of stimuli was reversed for one half of the subjects in each group. A simultaneous measure of muscle tension from the trapezius muscle was recorded by an electromyograph. A subjective report was obtained from each subject at the conclusion of the experimental procedure. The hypothesis of this study was that there would be a statistically significant difference between groups when comparing change in size of pupil. Further investigation was to be made into the relationship of pupillometry to other indices of anxiety.

Statistically significant differences in size of pupil were found between groups presumed to be different in motivational or arousal level as a function of different sequence in presentation of the stimuli. These findings suggest that pupillometry can discriminate short term affective states, although in this study pupillometry did not differentiate between anxiety groups. It did not relate well to the other measures of anxiety used in this study.

6. Agras, W. S. Transfer during systematic desensitization therapy. Behaviour Research and Therapy, 1967, 5, 193-199.

Transfer of learning from systematic desensitization therapy, to a test within therapy, in which G.S.R. to the imagination of a series of feared scenes was serially recorded, and to the actual feared situation, was studied during the course of therapy in five agoraphobic patients. A delay of transfer from therapy to the feared situation was found. It appears likely that therapists carry out transfer training unwittingly during therapy. It is suggested that the discrepancies found in the literature can be explained by therapist variables such as degree of therapeutic intent, and patient variables such as degree of dependence shown by the patient.

7. Alexander, A. A. Physiological periodicity: Analyses, psychological and psychopathological correlates. (Doctoral dissertation, University of Wisconsin) Ann Arbor, Mich.: University Microfilms, 1962. No. 63-629.

Forty Ss, divided equally between psychiatric inpatients and non-patient volunteers, balanced for sex, were tested on a Grass polygraph while resting in a minimal stimulus situation. Six minutes of each record of each variable for each S were analyzed by a variance spectrum technique allowing quantification of the frequency and amplitude of any periodic activity that occurred in each. The range of frequencies examined for periodicity was from 0.5 to 0.008 cycles per second (periods of from 2 to 120 seconds). Eighty seven and one half percent of the Ss tested demonstrated at least minimal periodicity in one or another of the physiological measures.

It was also hypothesized on the basis of homeostatic and psychoanalytic concepts, that form of periodicity would be idiosyncratic and would have psychological concomitants. It was found that individuals with high frequency periodicity in any one of the four variables sampled were significantly more disturbed and (or) more poorly adjusted, as measured by psychiatric status and the Barron Ego Strength Scale, than were individuals with long period activity.

The relationships of periodicity to measures of reaction time means and standard deviations of each physiological function, other MMP! scales, clinical ratings, psychiatric diagnoses, and clinical outcome were also examined and discussed.

8. Alexander, A. A., Rossler, R., & Greenfield, N. S. Ego strength and physiological responsivity: III. The relationship of the Barron Ego strength scale to spontaneous periodic activity in skin resistance, finger blood volume, heart rate, and muscle potential. Archives of General Psychiatry, 1963, 9, 142-145.

Of 20 psychiatric patients and 20 normal volunteers, "21 were periodic at a high frequency.... on 1 or more of the physiological measures....(and) had a significantly lower mean Es score ($p < 0.01$) than did the group classified as exhibiting low-frequency periodicity. Within the group of high-frequency individuals, those with periodic activity on more than one variable had a significantly lower ($p < 0.02$) mean Es score than those periodic on only one variable.

9. Alexander, F., Flagg, G. W., Foster, S., Clemens, T., & Bland, W. Experimental studies of emotional stress: I. Hyperthyroidism. Psychosomatic Medicine, 1961, 23, 104-114.

On the basis of this study, we believe that we have succeeded in developing a methodology and instruments sensitive enough to establish reliable correlations between a standardized psychological stimulus (movie), the experimental subjects' psychological defenses, and responses in the autonomic nervous system and in thyroid function of treated and untreated thyrotoxic patients and controls.

10. Alfert, E. Comparisons of response to a vicarious and direct threat. Journal of Experimental Research in Personality, 1966, 1, 179-186.

Researchers using vicarious stress situations that involve the use of motion-picture films assume that response patterns observed in the vicarious situation would also be found in real life direct stress situation. To test this assumption, responses to a vicarious stress situation (accident film) were compared to responses to a direct stress situation (threat of shock). Results showed some similarity of physiological and affective arousal in the 2 situations, as well as some differences in responses specific to the stimuli. Significant correlations between the responses of individuals to the 2 forms of threat indicate that stress responses to film threat situations can be used to predict stress responses to situations of direct threat.

11. Alfert, E. An idiographic analysis of personality differences between reactors to a vicariously experienced threat and reactors to a direct threat. Journal of Experimental Research in Personality, 1967, 2, 200-207.

Idiographic methods were superior to nomothetic methods in determining personality differences between reactors to a direct threat and reactors to a vicariously experienced threat. Forty-eight Ss who had previously responded to a personality inventory were exposed to two situations; they anticipated receiving an electric shock and they viewed a film during which accidents to the film characters could be anticipated. Heart rate, skin conductance, and anxiety were measured. An item analysis indicated that Ss who reacted more to the direct threat than to the vicariously experienced threat were self-confident, extrovert, dominant, and at ease in social relationships. Ss who reacted more to the vicariously experienced threat were low in self-confidence, introvert, anxious, inhibited in impulse expression, and uneasy in social interaction and interpersonal relationships.

12. Almy, T. F., Kern, F., Jr., & Abbot, F.K. Constipation and diarrhea, as reactions to life stress. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 724-731.

This report relates changes in tone and phasic activity of the sigmoid colon to emotional topics selected from the personal history of each subject.

13. Antrobus, J. S., Antrobus, J. S., & Singer, J. L. Eye movements accompanying daydreaming, visual imagery, and thought suppression. Journal of Abnormal and Social Psychology, 1964, 69, 244-252.

Relationship between oculomotor activity during the waking state and internally produced cognitive processes such as daydreaming and visual imagery were studied by means of continuous electro-oculograms. 24 female college students served as Ss. Eye movements and blinks were more frequent following instructions to engage in active rather than passive thinking; more frequent following instructions to suppress than to generate a w.d.m. Greater ocular activity was observed under instructions to imagine moving than to imagine static visual imagery, the difference holding for both eyes open and closed conditions.

14. Arnold, M. B. Emotion and personality. Vol. II. Neurological and physiological aspects. New York: Columbia University Press, 1960.

This volume suggests that a phenomenological analysis of emotional experiences can be used to identify the brain structure and pathways that mediate feelings and emotions. The theory is developed from the integration of psychological, neurological, and physiological data.

Chapter 5, Emotion, consciousness, and the EEG: discusses encephalographic studies of the two systems of the brain that influence its activity level. The brain stem reticular system and the diffuse thalamic system - called the "activating systems." A minor section of the chapter deals with the relationship between theta activity and the pleasant-unpleasant continuum.

In Chapter 7, Physiological effects of emotion: emotion is discussed as an urge to action induced by the appraisal that something is good or bad for us and demanding a particular way of dealing with it. The physiological correlates of fear, anger, startle, and panic are discussed.

15. Arthur, R. O. Blood pressure rises on relevant questions in lie detection--sometimes an indication of innocence not guilt. Journal of Criminal Law, Criminology and Police Science, 1955, 46, 112-115.

During polygraph tests subjects very often respond to the crime questions with a definite rise in blood pressure. Whenever this happens, the examiner should be very wary before deciding that such a reaction is one indicating deception. This is particularly true if there were no significant changes in the subject's respiration on these same questions.

With the proper utilization of the Raskin control-questioning technique, any one of four criteria can be applied. Apparently, only with this technique can an examiner accurately determine if a blood-pressure rise is one indicating lying, or if it is a rise due to truthfulness.

The writer is confident that if these four criteria are properly applied, the reason for the majority of the lie detection errors occurring today will be eliminated.

16. Auld, F., Jr., Dreyer, H. W., & Dollar, J. Measurement of electrical skin resistance during interview. Psychological Reports, 1958, 4, 11-15.

The authors have described equipment suitable for recording electrical skin resistance during interviews: an electrode-holder that maintains good contact of electrodes with the skin without causing discomfort to the patient, and a zero-suppression circuit that is believed to be superior to bridge circuits. Some typical results obtained with this equipment have been described.

17. Averill, J. R. Autonomic response patterns during sadness and mirth. (Doctoral dissertation, University of California, Los Angeles) Ann Arbor, Mich.: University Microfilms, 1966. No. 66-12, 837. .

The purpose of this investigation was to describe and compare the physiological reactions accompanying sadness and mirth. The experiment involved three independent groups of 18 Ss each, hereafter referred to as the sadness (S) group, the mirth (M) group, and the control (C) group.

The psychological reactions indicated that the sad and comedy films were adequate stimuli for sadness and mirth. The most characteristic responses of the S group were in terms of sadness, unpleasantness, tenseness, and involvement. No desire for overt activity was expressed and, when the reactions of one atypical S were removed, ratings of sadness were significantly correlated with ratings of weakness and a tendency to be more yielding. This pattern corresponds well with that found during natural grief reactions. Within the M group, 61% of the Ss responded with audible laughter and ratings of mirth were significantly correlated with ratings of strength.

In comparison with the C group, both the S and M groups showed significantly greater palmar conductance and GSR rates. The S group also showed significantly greater systolic and diastolic blood pressure, and maximum decrease in finger pulse volume, while the M group showed significant increases in respiration rate and respiratory irregularity. In general, physiological activation was common to both the S and M groups with cardiovascular changes being more prominent during the sadness condition, while respiratory changes were more characteristic of mirth.

18. Averill, J. R. Autonomic response patterns during sadness and mirth. Psychophysiology, 1969, 5, 399-414.

Autonomic responses were recorded from three groups of subjects as they viewed a sadness-inducing film, a comedy film, or a control film. Psychological reactions indicated that the stimulus films were effective in eliciting sadness and mirth. Physiologically, sympathetic activation was common to both emotions, with cardiovascular changes being more prominent during sadness and respiratory changes more characteristic of mirth. The relevance of these findings for the investigation of differential physiological patterning during emotion is discussed, and an hypothesis is presented concerning the biological significance of grief.

19. Ax, A. F. The physiological differentiation between fear and anger in humans. Psychosomatic Medicine, 1953, 15, 433-422.

Seven different physiological indicators, simultaneously recorded from 43 adult subjects individually subjected alternately to fear-inducing and anger-arousing situations, yielded 14 indices, 7 of which significantly differentiated anger and fear profiles. That of anger was similar to the reaction accompanying injections of both norepinephrine and epinephrine, while the fear profile resembled that following epinephrine injection. The data are held to extend, rather than refute, Cannon's hypothesis of a unitary visceral excitement reaction.

20. Ax, A. F. Psychophysiology of fear and anger. Psychiatric Research Report, 1960, 12, 167-175.

On the basis of an experiment previously published it is concluded that "dynamic processes are highly specific for a given individual in a particular situation at a given moment in time.... Science must construct a concept that abstracts the element common to two or more events. There are three levels in the orderly hierarchy of classifying such commonalities. The first level describes what is common among subsequent responses of one individual to a given situation.....On the second level is the commonality that remains after the stimulus situation changes.....The third level abstracts commonality found among the individuals of a group."

21. Ax, A. F. Goals and methods of psychophysiology. Psychophysiology, 1964, 1, 8-25.

The purpose of this essay is to identify the research area of psychophysiology by abstracting the goals and methods from reports which this author believes are properly called psychophysiological. The general goal of psychophysiology is to describe the mechanisms which translate between psychological and physiological systems of the organism. Specific goals are to identify and describe the physiological processes directly relevant to such psychological constructs as drive, motivation, attitude, emotion, and their modification by learning.

Findings include the description by physiological patterns of several emotions, sleep, dreaming, hypnosis, psychiatric and psychosomatic conditions. Principles conceived are individual, stimulus, emotion and attitude specificities and the "law of initial values."

22. Ax, A. F., & Bamford, J. L. Validation of a psychophysiological test of aptitude for learning social motives. Psychophysiology, 1968, 5, 316-332.

This study was based on two assumptions. The first is that the hierarchy of motives is learned. "Hierarchy of Motives" is a concept denoting those largely unconscious systems which enable the selection of alternative behavior. The second assumption is that learning the hierarchy of motives requires an aptitude which varies widely in the population. The working hypotheses were: (1) presently measured aptitudes and environmental influences are insufficient to account for the observed variance in performance, and (2) that a discriminative learning task which requires a differential physiological response of the autonomic nervous system can measure the aptitude for learning social motives.

Sixty-three Negro subjects were classified into two relatively higher and lower motivation groups based on their history of employment (from interview data) or on vocational training school teachers' ratings. They were subjected to a single session of discriminative classical autonomic conditioning involving tones and pain, and given intelligence, personality, and level of aspiration tests. It was found that 18 variables, each individually statistically significant, when combined by means of a discriminant function analysis, classified 92% of the subjects into their correct criterion (motivation) groups. It was concluded that the working hypotheses were strongly confirmed and that the two assumptions were supported.

23. Ax, A. F., & Greenblatt, M. Autonomic responses and emotions: Further discussion. In P. K. Knapp (Ed.), Expressions of the Emotions in Man. New York: International Universities Press, 1963. Pp. 197-205.

In this chapter Greenblatt discusses emotion in terms of an interacting diad. He also points out the need to view emotion as an on-going processes rather than solely triggered by a discrete time-limited act.

B

24. Back, K. W. Bases and consequences of systems of communication. Annual Status Report, October 1, 1964--September 30, 1965, Duke University, Contract Nonr 1181(11) NR 177-470.

The research is divided into three categories-socio-physiological studies, studies on group structure, and studies on the methodology of social research. Studies undertaken during the past year are as follows: Group dependence and group effect studies; group separation study; control, clarity and stress; initial experience studies; obesity study; conformity studies: group studies; logic; time-sampling as a field technique; structural changes in task-oriented groups; group status and perceived status; role expectations; integration; empathy in a factory situation; methods of social research; information or noise; idea-orientation situation; self-orientation situation; conflict situation; apathy situation; motivation behind doing research.

25. Back, K. W., & Bogdonoff, M. D. Plasma lipid responses to leadership, conformity, and deviation. In P. H. Leiderman & D. Shapiro (Eds.) Psychobiological approaches to social behavior. Stanford, California: Stanford University Press, 1964. Pp 24-42.

From two points of departure--the impact of sociology upon medicine, on the one hand, and the potential usefulness of physiological responses to experimental sociology, on the other-- we may best summarize the lessons we have learned. First, it appears well established that the specific characteristics of group interaction do modify differentially the physiological responses of our subjects. From the fact that even within the confines of the laboratory sociological forces have turned out to be significant determinants of the process of lipid mobilization, we may reasonably conclude that eventually the epidemiologic observations concerning disease may be tested experimentally. This link between the clinical observations and those of the laboratory is still in the initial stages of development. Second, there are some general conclusions to be drawn about the sociological variables of pressure to conform, leadership, and group membership. We may say, for example, that if the social situation is perceived simply as a background to individual achievement, the dominant variable will be the potential for individual achievement and its meaning. In this situation, pressure to conform and pressure to assume leadership may be viewed as arousing stimuli, and the individual may seek to avoid these situations. If, however, the group relationship has the dominant meaning, the performance of the task may be seen in terms of the group interaction, and then deviation from the group norm becomes the arousing condition. Conforming behavior is then attended by decreased arousal.

Third, and finally, these studies have demonstrated that the marked variability between individuals makes it necessary that the experimenters fully understand the specific meaning that the experimental condition holds for the subjects. Furthermore, it has become quite apparent that group relationships may provide either arousing or reassuring connotations for the individual, and that only by the simultaneous measurement of a physiological variable can we successfully identify exactly what response the stimulus evokes.

26. Back, K. W., Bogonoff, M. D., Shaw, D. M., & Klein, R. F. An interpretation of experimental conformity through physiological measures. Behavioral Science, 1963, 8, 34-40.

Consideration of physiological measures during the experimental process has led us to a greater distinction between different types of reactions which lead to high conformity measures. A person can either conform because he thinks that this is the way to get a higher score (the low-cohesive-low-ability group) or because of his relation to the group (the high-cohesive-high-ability group). In the first case the task becomes easier, decision making is given up, and the arousal level decreases during the conformity procedure. In the second case the person feels the conflict and responsibility inherent in the situation and his arousal level increases. The physiological measure makes it possible to evaluate the subjects reaction to the experimental situation while concentrating on the variables which the experimenter wishes to introduce into the situation.

27. Back, K. W., Wilson, S. R., Bogdonoff, M.D., & Troyer, W. G. Racial environment, cohesion, conformity, and stress. Journal of Psychosomatic Research, 1969, 13, 27-36.

Ninety-five white and 72 Negro college students were presented a series of problems in a setting where there was little or much prior structuring (experimental stress), where the task was done among strangers or friends, and where the degree of S's conformity to specious group norms could be measured. The free fatty acid levels indicated more arousal in those unprepared, those among strangers, and those more inner-than-outer-directed (Linton and Grahams' Inner-Directed, Outer-Directed scale). Arousal stayed highest in thin Negroes. Conformity to the specious group answers was highest for people among friends, especially the Negroes.

28. Baesen, H. V., Chung, C. M., & Yang, C. Y. A lie-detector experiment. Journal of Criminal Law, Criminology and Police Science, 1948, 39, 532-537.

The purpose of this lie-detector experiment was to attempt to determine between actual guilt and the possession of guilty knowledge. A mock crime of theft was devised involving a perpetrator and an observer of the act. A total of 200 sets of test questions were administered to 50 pairs of subjects resulting in 86% correct interpretation. Further results and the conclusions reached are discussed.

29. Baker, J. W., II, & Schaie, K. Effects of aggressing "alone" or "with another" on physiological and psychological arousal. Journal of Personality and Social Psychology, 1969, 12, 80-86.

The hypothesis that aggressive experience reduces frustration as expressed by physiological and psychological arousal was investigated by assessing differences in arousal reduction achieved by the subject counteraggression alone or through aggressive responses expressed with another person (vicar). Counteraggression occurred through overt (physical and verbal) and covert (fantasy and abated) means. One hundred twenty-eight undergraduate males were assigned to the different treatment conditions. Significant changes in systolic blood pressure were noted as a function of overt means of counteraggression. Effects of counteraggressing alone or with another, however, did not differ significantly.

30. Balshan, I. D. Muscle tension and personality in women. A factorial study. Archives of General Psychiatry, 1962, 1, 436-448.

In 80 nonvolunteer college women action potentials of 16 muscle groups, palmar skin resistance, heart rate, and respiration rate were recorded during 10 minutes of rest and 1 minute white noise stimulation "(1) a factor of general muscle tension, centered about the limb musculature, exists in women during rest and during stimulation. (2) With the exception of log conductance change, the general muscle tension factor appears to be unrelated to the autonomic nervous system. (3) Muscle tension in response to a stimulus appear to be more closely related to certain personality characteristics than tension exhibited during a resting state."

31. Bankart, C. P., & Lanzetta, J. T. Dissonance and desire for a cigarette. Psychological Reports, 1968, 23, 1155-1161.

Recent research has demonstrated that primary drives such as hunger, thirst, and pain can be affected by induction of dissonance. Heart rate was employed as a measure of dissonance. The purpose of the present experiment was to determine whether an acquired drive, desire for a cigarette, could be similarly modified. Twenty-six Ss were divided into two equal groups of heavy smokers. One group of Ss was paid \$1.50 for 6 hr. of deprivation whereas the other group was not. It was hypothesized that highly dissonant Ss would show less drive-relevant behavior than low-dissonant Ss after deprivation. The results, though generally in the predicted direction, were not significant.

32. Barber, T. X., & Hahn, K. W., Jr. Physiological and subjective responses to pain producing stimulation under hypnotically-suggested and waking-imagined "analgesia." Journal of Abnormal and Social Psychology, 1962, 65, 411-418.

Waking-imagined analgesia was found to be as effective as hypnotically suggested analgesia in attenuating pain (produced by immersion of a limb in water near the freezing point for 3 minutes) as indicated by subjective reports of reduced pain experience and by reduction in respiratory irregularities and forehead muscle tension. Neither waking-imagined analgesia nor hypnotically-suggested analgesia affected two autonomic responses (cardiac accelerations and reduction in skin resistance) which are normally elicited by painful stimulation.

33. Barber, T. X., & Hahn, K. W. Jr. Experimental studies in "Hypnotic" behavior: Physiologic and subjective effects of imagined pain. Journal of Nervous and Mental Disease, 1964, 139, 416-425.

Forty-eight female Ss, selected as responsive to suggestions, were randomly assigned to three "waking" groups and one "hypnosis" group with 12 to each group.

In the first part of the experiment, all Ss were tested on subjective and physiologic responses to a pain-producing stimulus (water at 2 degrees C. applied to a limb for one minute). Suggestions of "analgesia" or reduced pain responsiveness were not administered under either the "hypnosis" or "waking" conditions. The "hypnotized" group and the "awake" groups did not differ significantly in subjective or physiologic responses to this stimulus; both "hypnotized" and "waking" Ss showed increased heart rate, increased frontalis muscle tension and reduced skin resistance, and reported that the stimulus was experienced as painful.

In the second part of the experiment, Ss in the "hypnosis" group and in one "waking" group were instructed to imagine that they were again receiving the pain-producing stimulus, a second "waking" group again received the actual pain-producing stimulus, and a third "waking" group received an innocuous stimulus. The major findings were:

1) Instructions to imagine the painful stimulus were more effective with the "hypnotized" Ss than with the "awake" Ss in eliciting subjective reports of discomfort and pain.

2) Instructions to imagine the painful stimulus produced similar physiologic effects in the "hypnotized" group and in the "awake" group: both groups showed physiologic responses (significantly increased heart rate and frontalis muscle tension and a tendency toward reduction in skin resistance dissimilar to the responses of the group given the innocuous stimulus and similar to the responses of the group actually given the painful stimulus.

34. Barclay, A. M. The effect of hostility on physiological and fantasy responses. Journal of Personality, 1969, 37, 651-667.

Sixty-four members of fraternities and sororities were made angry in an attempt to demonstrate the existence of a connection between anger and sexuality for men and women. Subjects wrote stories to four TAT pictures, two of which were male dominant and two were female dominant. Urine samples were obtained from the men in order to measure the amount of acid phosphatase, which has been suggested as a possible indicator of sexual arousal. Aroused groups evidenced greater sexuality for pictures which are culturally appropriate for sexual expression. Acid phosphatase values also indicated angry men were sexually aroused. This finding provides a measure of construct validity for the sexuality scoring scale.

The results are discussed in terms of a connection between aggression and sexuality as well as two distinct types of defensiveness resulting from situational cues and cues provided by the TAT pictures themselves. Various alternative explanations are eliminated by the results which are also discussed from the view point of replicating earlier studies.

35. Barclay, A. M. Urinary acid phosphatase secretion in sexually aroused males. Journal of Experimental Research and Personality, 1970, in press.

Previous studies have suggested the use of urinary acid phosphatase (AP) as an indicator of sexual arousal although some difficulties have been found when comparing arousals for individual subjects. Fifty-five male subjects were tested in three conditions, an arousal with information, an arousal with false information, and one non-aroused group, with no significant increases in AP following sexual arousal. When subjects were assigned to aroused and control groups based on their self-definition of arousal, a significant increase in AP was found for the aroused group as well as a significant decrease for non-aroused subjects. The results are discussed in terms of general and specific indicators of arousal.

36. Barclay, A. M. Information as a defensive control of sexual arousal. Journal of Personality & Social Psychology, in press.

In order to demonstrate the effect information about the true nature of an experiment has when the experiment deals with areas of defensive concern such as sexuality, 61 male subjects were shown a sexually arousing film or a boring film under conditions where subjects either knew the true purpose of the study or were misinformed. Pre- and post-arousal urine samples were analyzed for urinary acid phosphatase, a possible indicator of sexual arousal. A significant interaction showed that informing subjects caused a paradoxical finding; acid phosphatase secretion was high in control subjects while those seeing an arousing movie showed no change from prearousal levels. Previous findings of increase acid phosphatase following arousal were replicated for non-informed subjects. In addition sexually experienced subjects responded to the film with increases in acid phosphatase secretion while sexually inexperienced subjects did not. The results are discussed in terms of defensive control of arousal and its implication for research dealing with high concern, high defensiveness areas such as sexuality.

37. Bardwick J. M., & Behrman, S. J. Investigation into the effects of anxiety, sexual arousal, and menstrual cycle phase on uterine contractions. Psychosomatic Medicine, 1967, 29, 468-482.

Ten female subjects were administered a battery of projective psychological tests and on the basis of the test results were divided into 2 groups. The women in one group were sexually anxious, passive, and neurotic, and the women in the other group were not sexually anxious, passive, or neurotic. When Ss were exposed to affect-arousing stimuli during all phases of the menstrual cycle, there were increases in the amplitude and tonus means and variance of uterine contractions. No relationship between menstrual cycle phase and stress effect could be noted. When only the significantly altered uterine and GSR curves were studied, sexually relevant stimuli had a markedly greater arousal effect than comparable sexually neutral stimuli for those Ss who were sexually anxious. Anxious Ss extruded the intrauterine balloon particularly when they were involved with sexual material. Those Ss who were not anxious evidenced tetanic uterine contractions in close correlation with significant increases in the GSR and BRL.

38. Barlow, J. D. Pupillary size as an index of preference in political candidates. Perceptual and Motor Skills, 1969, 28, 587-590.

Fifteen Ss were preselected as to political preference, actively supporting either a liberal or conservative political candidate and the pupils of their right eyes were photographed while viewing slides of these candidates. The white conservative preference group dilated to the slide of George Wallace and constricted to the slides of Lyndon Johnson and Martin Luther King, while the white and Negro liberal political preference groups reacted in the opposite manner; agreement was perfect between pupillary and verbal preferences.

39. Barlow, J. D. Pupillary size as an index of preference. Perceptual and Motor Skills, 1970, 31, 331-336.

Five Ss were shown groups of semi-erotic, neutral, and aversive photographs, and ranked them on a pleasant-unpleasant continuum. When compared to the pupillary ranks, significant agreement between the two ranks was noted. The absolute pupillary size was also positively correlated with absolute subjective scores given to photographs which were viewed on the pleasant-unpleasant continuum.

40. Bartenwerfer, H. Herzrhythmus-merkmale als Indikatoren psychischer Anspannung. [Pulse rhythm criteria as indicators of psychic tension.] Psychologische Beiträge, 1960, 4, 1-25.

Description of a method for the diagnosis of tension based on a discriminating-analytic study of pulse rhythm and the mean time between heart-beats (proportional to the pulse frequency). Experiments have provided evidence that there are definite relations between psychic tensions and pulse rhythm. Apparatuses for the registration of pulse rhythm and various possibilities for their application are described.

41. Bartenwerfer, H. Über art und bedeutung beziehung zwischen puls-frequenz und skaliertes psychischer anspannung (About the types and significance of the relations between pulse frequency and psychological tension). Zeitschrift für Experimentelle und Angewandte Psychologie, 1963, 10, 455-470.

In investigating problems related to the psychology of practice and habit-formation, of monotony, and of "attentiveness" in general, those physiological indicators of psychic tension which are not disturbed by the processes being investigated, are of primary interest. With this in mind, a series of investigations was conducted which showed a reproducible relationship between the frequency of heart-beat and various scaled responses as to the experience of psychic tension. This relationship is only stable for mean values of groups, whereby the stability increases with the size of the group. The investigations dealt with pulse frequency levels (after the disappearance of initial vacillations). Further investigations showed that the relationship between pulse frequency and psychic tension remains even in the presence of simultaneous, rather constant, moderate stress due to muscular activity and increased room temperature. The possibility is indicated of analysing the pulse frequency under a combination of psychic, muscular, and temperature stress into components, which could be related to the individual stress factors.

42. Bartenwerfer, H. Einige praktische konsequenzen aus der aktivierungstheorie. (Some practical consequences of activation theory). Zeitschrift für Experimentelle und Angewandte Psychologie, 1969, 16, 195-222.

After a theoretical consideration on general (unspecific) central activation (GCA) four methods are described for measuring mean degrees of GCA for groups of persons in fixed situations (i.e., working activities). The degree of GCA varies on an interval scale with a zero point at deep dreamless sleep.

Two methods are based on the scaling of statements about "inner (nonmuscular) tension". The two other methods consist of the measurement of a certain part of heart rate changes. In the fields studied up to now the results of all four methods are in linear correlation both with one another and with scaled ratings of groups of experts.

The methods have been developed with regard to practical applicability in school and industry. Validity studies have shown the practical applicability and validity even under unfavorable circumstances.

43. Bartlett, R. J. Does the psychogalvanic phenomenon indicate emotion? British Journal of Psychology, 1927, 18, 30-50.

The psychogalvanic phenomenon follows a variety of complex changing mental states many of which would ordinarily be described as 'emotional' and yet may yield to introspective enquiry cognition and/or conation only. It seems best in the present state of our knowledge to describe these complex states as 'orectic process' in which 'feeling' and 'striving' are mingled: but in view of the fact that when cognized, the initial phase of markedly conative experience, accompanied by deflection, is reported to be dominantly subjective in character, and that large deflections are obtained when the dominant awareness is one of being impressed by the cognized stimulus, it seems probable that the mental cause of the physiological change that brings about the deflection is of the nature of passive endurance or enjoyment rather than of active striving or willing.

44. Bartoshuk, A. K. Electromyographic gradients as indicants of motivation. Canadian Journal of Psychology, 1955, 9, 215-230.

Previous electromyographic (EMG) studies of mirror tracing and attentive listening reported EMG gradients, that is, a progressive increase in muscle potentials from the beginning to the completion of a given psychological task. Results on completed and interrupted tasks suggested that the slope of EMG gradients may be indicative of motivation. If this were true, gradient slope should be directly related to performance speed and accuracy. This experimental hypothesis was tested in the present EMG study of 25 subjects through 24 trials of mirror tracing.

An analysis of variance revealed that significant differences in gradient slope could be attributed to intermuscle differences, and to differences between subjects for each muscle. With subjects equated for practice, gradient slope (especially for right forearm extensor) was directly related to speed and accuracy of performance. Moreover, intertrial changes in gradient slope were related to rate of performance improvement. Evidence from other studies reviewed showed that gradient slope was also related to reported interest in the task, and to magnitude of incentives offered for good performance. These results support the hypothesis that gradient slope is a direct function of strength of motivation to perform a given task.

45. Bartoshuk, A. K. Electromyographic gradients in goal-directed activity. Canadian Journal of Psychology, 1955, 9, 21-28.

Previous research indicated that muscular activity, measured as electromyographic potentials (EMGs), increased progressively during a motor task. The possible significance of such EMG gradients was examined. A specially adapted ink-writing electroencephalograph, coupled with electronic integrators, provided continuous EMG recordings from active forearm extensors and flexors, and from chin. Seventeen male Ss performed mirror tracings under the two conditions of completed and interrupted tasks.

Mean EMGs in active forearm and in chin increased progressively during the tasks. Drawing speed did not similarly increase; hence EMG gradients cannot be attributed to variations in drawing speed. Extensor gradients, averaged for all tasks, correlated with the relative maintenance of EMG potential after interrupted tasks as against completed tasks. These results suggest that EMG gradients may reflect the strength of S's motivation to do the task.

46. Bartoshuk, A. K. EMG gradients and EEG amplitude during motivated listening. Canadian Journal of Psychology, 1956, 10, 156-163.

EMG gradients, defined as progressive increases in muscle potentials during a given task, have been observed in mirror tracing, tracking, and listening situations. Bartoshuk's hypothesis, that the slope of some EMG gradients is a function of motivation to do the task, has been supported by data on interrupted tasks, performance scores, interest in the task, and the effect of incentives. The present experiment examined the relation of EMG gradients to arousal (as indicated by EEG amplitude).

Combined results from a previous experiment by Wallerstein and this one demonstrated the significant occurrence of forehead EMG gradients during listening. A positive correlation between gradient slope and reported interest supported the hypothesis that forehead EMG gradients were indicative of motivation to listen. In the present experiment the slope of forehead EMG gradients was inversely related to EEG amplitude in the first hearing of the story, but not in subsequent repetitions of it. It was concluded that slope of forehead EMG gradients (and therefore motivation to listen) depended on both arousal state and the cue function postulated by Hebb.

47. Becknell, J. C., Jr. Automated pupillary reaction measurement. Paper presented at the meeting of the Advertising Research Foundation, November 1967.

Of the physiological measures which have been suggested as possible measures of the effect of advertising, none has caught the imagination of researchers to a greater degree than the reaction of the pupil of the eye to stimuli other than light. From the early work of Eckert Hess, followed up by Herbert Krugman and others at Marplan, it has been shown that the pupillary reaction is indeed a reliable measure of some form of cortical activity related to the person's seeing or not seeing a specific object. The validity of the measurement as a predictor of sales has also been documented both by Marplan and others, especially in the area of packaging.

The purpose of this paper is three-fold: first, to describe a new system which automatizes the measurement and data reduction of the reaction of the pupil of the eye to varying stimuli or objects. The second purpose is to give certain basic findings which relate to the utilization of pupillary measurement as a relatively precise tool. The third purpose is to present a fact sheet relating to the experience which we and Associates for Research in Behavior have had up to this time with the device.

48. Becknell, J. C., Jr. Physiological approach to measuring consumer motivation. Paper presented at the meeting of the American Psychological Association, San Francisco, August 1968.

The author concludes that, "No physiological measure is near proven as a good evaluator of advertising, but then neither are any of the techniques which have greater face validity. The validity question itself is the major one facing us in advertising research today and we are kidding ourselves far worse than we are kidding our clients if we don't face up to it."

49. Begleiter, H., Gross, M. M., & Kissin, B. Evoked cortical responses to affective visual stimuli. Psychophysiology, 1967, 3, 336-344.

The influence of affective meaning on visual evoked responses was investigated in male college students. By utilization of conditioning procedures, previously meaningless figures (CS) acquired affective loadings, e.g., positive, negative, and neutral. The semantic differential scale and critical flicker interval (CFI) were used as indices of conditioning. Although conditioning occurred without awareness, both measures of conditioning yielded results in the same direction, and all three affective conditions differed significantly from one another. Averaged evoked responses were obtained for each affective stimulus. Amplitudes were found to differ significantly from one another in all three conditions, the unpleasant stimulus eliciting the lowest evoked response, and the neutral condition evoking the highest amplitude. Significantly shorter latencies were obtained for the unpleasant stimulus, whereas the latencies of the positive and neutral stimuli did not differ significantly from each other. The results suggest a direct influence of the emotional centers (limbic system) on the visual perception of affective stimuli. Further studies were suggested to clarify the role of awareness and the specific modalities involved in conditioning.

50. Begleiter, H., Gross, M. M., Porjesz, B., & Kissin, B. The effects of awareness on cortical evoked potentials to conditioned affective stimuli. Psychophysiology, 1969, 5, 517-529.

A previous paper of ours (Begleiter, Gross, & Kissin, 1967) demonstrated that it was possible to condition affective meaning to meaningless figures (CS), and significantly alter visual evoked potential (VEP) amplitudes and latencies to them, without the S's awareness of the CS-UCS relationship (Experiment I, totally unaware). In the present study some Ss were deliberately informed that a CS-UCS connection existed; however, the exact nature of their relationship was not divulged (Experiment II, slightly aware). Other Ss were explicitly informed of the correct CS-UCS contingency, and entire conditioning paradigm (Experiment III, fully aware). One physiological (VEP) and two behavioral (interflash interval and semantic differential) indices of conditioning were obtained during an extinction procedure, and demonstrated significant differences between CRs in Experiment II, but none in Experiment III, VEP amplitudes to positive and negative CSs were enhanced in Experiment II, and suppressed in Experiment I, in comparison to the neutral CS. This effect was most marked in responses to the negative CS. It is suggested that level of awareness of the CS-UCS contingency might be reflected in our physiological index of conditioning - VEP amplitude.

51. Begleiter, H., & Platz, A. Cortical evoked potentials to semantic stimuli. Psychophysiology, 1969, 6, 91-100.

The influence of affective meaning on the photically evoked response was studied in male college students. Three sets of stimuli were used: taboo words, neutral words, and blank flashes. Two blocks of trials were run for each stimulus, one in which the S responded by calling the stimulus presented, and a second in which the S was not required to respond.

The late components of the evoked potential were significantly related to both the stimulus and response conditions. Amplitude 2 was larger for the taboo words than for either the neutral words or the blank flash. The taboo words had a significantly greater amplitude 3 than neutral words, and both sets of words had higher amplitude 3 than the blank flash. The stimulus effect was discussed in terms of the possible influence of anatomical structures involved in emotional behavior on the visual evoked response. The response effect was felt to be the result of the increased attention required under the response condition.

52. Bekkering, J. D., Kamp, A., De Lange, J., Van Leeuwen, W. S., & Werre, P. F. Correlations entre l'analyse des fréquences et quelques phénomènes psychologiques (Correlations between frequency analyses and some psychological phenomena.) In H. Fischgold & H. Gestaut (Eds.), Conditionnement et réactivité en électroencéphalographie. Paris: Masson, 1957. Pp 203-210.

The electrical activity of the brain (8 leads) and of the heart, the resistance of the skin and the vibrations of the voice are recorded polygraphically. Automatic, simultaneous analysis of the frequencies of one or several leads is also made.

During the recording, the subject is asked to obey certain orders: to open and shut his eyes, to do mental arithmetic, to answer various questions, to evoke visual images and to make verbal associations.

Under these conditions, different electroencephalographic reactions are observed both in the primary record and in the analysis spectrum. These reactions are more or less characteristic of a given subject, but vary markedly from one subject to another.

Using these observations, we have tried to group the subjects in various categories and to establish correlations with the results of the Rorschach test.

53. Bender, W. R. The effect of pain and emotional stimuli and alcohol upon pupillary reflex activity. Psychological Monographs, 1933, 44, 1-32.

An investigation was made of the effects of two kinds of stimuli on the pupillary reflex. One form of stimulus was light and the other was extra-photoc-painful and emotional stimuli and alcohol. The minimum diameter of the pupil was reached in less than 5 seconds, the average contraction time was 3.7 seconds and the latent period was about .2 seconds. In persons subjected to painful stimuli before or simultaneously with exposure to light, the pupil showed a more prompt initial contraction immediately following the latent period. In most cases the pupillary light reflex was inhibited when emotional stimuli were given before or simultaneously with exposure to light. After the pupil had reached its minimal diameter from a light stimulus, the introduction of a painful or emotional stimulus caused its size to fluctuate over a small range. Irregular effects on the pupillary reflex were obtained by the ingestion of alcohol.

54. Bergeron, J. A. Physiological reactivity of schizophrenic and control subjects to dimensions of primary intensity of pure tones and of socioemotional significance of words. (Doctoral dissertation, University of Massachusetts) Ann Arbor, Mich.: University Microfilms, 1967. No. 67-12, 537.

Electrical skin conductance, finger movement, respiration and verbal reaction time response measures of good premorbid (GPM) and poor premorbid (PPM) schizophrenics, selected on the basis of the Phillips Scale, to dimensions of primary intensity of sound stimuli and of socioemotional significance of words were examined and compared to responses given by normal controls composed of male attendants at the same hospital.

The major findings were: (1) A significant difference in resting level of arousal was found between GPM schizophrenics, PPM schizophrenics and normal controls. The GPM schizophrenics were the least aroused group, and the normal controls were the most aroused group. (2) Regardless of chronicity or premorbid classification, schizophrenics were less responsive to stimuli with acquired intensity value than to stimuli of primary intensity value. (3) A prediction, based on Epstein's suggestion that the magnitude of the response of schizophrenics would not follow stimulus intensity dimensions as directly as the magnitude of the responses of normal controls, was upheld. The lack of correspondence was greater to word stimuli than to sound stimuli in schizophrenics.

55. Bergum, B. O., & Lehr, D. J. Affect level, capillary pulse pressure, and response latency. Journal of Applied Psychology, 1967, 51, 316-319.

An experiment was conducted in which the effects of the interest value of stimuli on pulse rate, capillary pulse pressure, and overt evaluation response latencies were examined. A group of 12 Ss evaluated 20 4-letter words in terms of an interesting dull dimension under both visual and auditory presentation conditions while the 3 measures of interest were simultaneously and continuously recorded. The results indicated no relationship between pulse rate and interest level, but significant functional relationships between both capillary pulse pressure and overt response latencies and levels of interest. These results substantiated the findings for the latter 2 measures demonstrated in a earlier study which employed pictorial stimuli and a pleasant-unpleasant overt response dimension. The relationships were demonstrated to be unaffected by presentation conditions, and it was concluded that capillary pulse pressure and overt response latencies may discriminate among general affect levels over a broad range of conditions.

56. Berkhout, J., Walter, D. O., & Adey, W. R. Automatic computation of evoked heart-rate and pulse-volume responses to verbal stimuli. Behavioral Science, 1969, 14, 393-403.

Evoked heart-rate and pulse-volume averages of ten seconds' duration were calculated as responses to verbal stimuli, associated with an experimental interrogation. These evoked responses were automatically computed and plotted off line, calibrated in standard deviations on one axis and time on the other. Stimulus-triggered responses were cumulated across individuals for given stimuli, and across diverse stimuli for given individuals.

Several distinct individual-specific forms of evoked response were noted among the intra-subject averages. In inter-subject average responses to identical verbal stimuli, several operational stress points of the sentence syntax could be determined. Heart-rate responses appeared closely time-locked to the questions presented, while pulse-volume responses appeared more closely time-locked to the subjects' own answers.

57. Berkhout, J., Walter, D. O., & Adey, W. R. Autonomic responses during a replicable interrogation. Journal of Applied Psychology, 1970, 54, 316-325.

Heart-rate and pulse-volume responses to visual and auditory stimuli associated with a replicable interrogation were calculated as stimulus-triggered across-S averages for two experimental groups totaling 75 individuals. Certain stressful points within the interrogator's question syntax could be determined from these average evoked responses, and the magnitude of group reactions to specific question-answer items could be scaled. Differential responses to audiotaped and videotaped stimuli were observed, the audio-only format inducing greater and more varied autonomic changes. The actual stress-value of specific question items and the shape of each average response were contingent on the sequence in which the items were presented. Selected sub-groups of deceptive and embarrassing answers were isolated and separately evaluated. The implications of these observations for the analysis of the individual responses to specific questions are discussed.

58. Berlyne, D. E. Conflict and the orientation reaction. Journal of Experimental Psychology, 1961, 62, 476-483.

Three experiments were carried out with the dual aim of studying the influence of collative stimulus properties on the amplitude of the orientation reaction and testing the hypothesis that conflict underlies the motivational effects of collative variables. The GSR was used as an index of the orientation reaction.

In Exp. I, using forced-choice and free-choice reactions, GSR amplitude increased with degree of conflict, unconfounded with novelty, surprisingness, intensity, and distance from fixation point, of stimuli. A preliminary phase with no overt responses showed that the effect was not due to inherent properties of the stimulus patterns, e.g., differences in complexity. In Exp. II, using word association, GSR amplitude increased with response uncertainty, regarded as a measure of degree of conflict. In Exp. III, stimuli that were surprising without being novel, surprise being interpreted as a form of conflict, likewise produced more intense GSRs than others.

59. Berlyne, D. E., & Borsa, D. M. Uncertainty and the orientation reaction. Perception and Psychophysics, 1968, 3, 77-79.

In Experiment I, blurred pictures evoked longer desynchronization than clear pictures but not more intense GSRs. Experiment 2 confirmed that the EEG effect depended on subjective uncertainty by showing that it did not occur when a blurred picture was immediately preceded by a clear version of the same picture.

60. Berlyne, D. E., Craw, M. A., Salapatek, P. H., & Lewis, J. L. Novelty, complexity, incongruity, extrinsic motivation, and the GSR. Journal of Experimental Psychology, 1963, 66, 560-567.

Skin resistance was recorded from human Ss, while each item of a sequence of visual patterns received 3 successive 3-sec. exposures at 12-sec. intervals. The patterns comprised "less irregular" and "more irregular" items, representing a number of "complexity" and "incongruity" variables. Extrinsically-motivated Ss, i.e., those who were told to attend carefully because they would later undergo a recognition test, produced more frequent GSRs than Ss without such extrinsic motivation. There was a decline in GSR frequency after the 1st exposure of a pattern but a revival when the next pattern appeared. There was also a long-term decline over patterns. Incongruous pictures evoked GSRs of greater mean amplitude than nonincongruous pictures. Some support was obtained for the conclusion that "more irregular" patterns are more likely to evoke GSRs than "less irregular" patterns.

61. Berlyne, D. E., & Lawrence, G. H., II. Effects of complexity and incongruity variables on GSR, investigatory behavior, and verbally expressed preference. Journal of General Psychology, 1964, 71, 21-45.

In two experiments, visual figures were given 0.2-second exposures, and GSRs were recorded. The aim was to study the effects of a number of variables that may collectively be placed under the headings of "complexity" and "incongruity" on the orientation reaction. Neither the first experiment, measuring skin potential, nor the second experiment, measuring skin resistance, showed any of these variables to have a significant effect on the magnitude of the GSR. The second experiment also tested the effects of some of the same variables on the rate at which the GSR declines with repeated presentation of a figure. There was such a decline, but its rate was not significantly influenced by any of the variables.

Later phases of the same experiments in which Ss could look at the figures for as long as they wished, showed exploration of more irregular (i.e., more "complex" or "incongruous") figures to be significantly longer with all five variables studied with low-complexity material and with one of three variables studied with high-complexity material. This confirmed an effect that previous experiments, using different techniques, had demonstrated with the low-complexity material, but that had not previously been tested with the high-complexity material.

The second experiment also incorporated a phase in which Ss had to rank-order the figures according to their degree of liking for them. Verbally expressed preference was not positively related to exploration time and, in contrast, there was a tendency, as far as some of the variables and the material as a whole are concerned, for less irregular figures to be preferred.

Finally, the second experiment showed figures previously seen in the GSR Phase to attract less prolonged exploration but a higher mean ranking in the Preference Test than figures not previously seen. A third experiment suggested that the effect on preference was due to familiarity rather than to the reduction of perceptual curiosity.

62. Berlyne, D. E., McDonnell, P., Nicki, R. M., & Parham, L. C. Effects of auditory pitch and complexity on EEG desynchronization and on verbally expressed judgments. Canadian Journal of Psychology, 1967, 21, 346-367.

In five experiments, EEG responses were recorded and verbal ratings of "complexity," "pleasingness" (or "pleasantness"), and "interestingness" were obtained from Ss exposed to auditory patterns of varying pitch and complexity. Mean duration of desynchronization was a U-shaped function of pitch, and white noise produced significantly longer desynchronization than pure tones both when equated for intensity and when equated for loudness. No significant difference was found between the mean durations for pairs of tones and single tones or for consonant pairs and dissonant pairs. Judged "complexity" did not follow objective criteria of complexity. The various ratings are discussed in relation to one another, to EEG effects, and to the results of previous experiments in which visual patterns were subjected to similar judgments.

63. Bernstein, A. S. Race and examiner as significant influences on basal skin impedance. Journal of Personality and Social Psychology, 1965, 1, 346-349.

In agreement with a previous study, basal skin impedance was higher for Negroes than for comparable white Ss among normal samples. This was true whether they were seen by a white or Negro examiner and among schizophrenic samples as well. An examiner effect was also demonstrated, with Ss seen by one examiner yielding significantly higher base impedance levels than those seen by the other. Neither S's race nor examiner effects were due to differential reaction by white or Negro Ss to either examiner. Race differences seem restricted to basal impedance level since differences in spontaneous electrodermal fluctuations were not significant. Such fluctuations showed considerable intergroup stability with regard to both mean frequency and variability of occurrence over a 6-min. period.

64. Berrien, F. K. A note on laboratory studies of deception. Journal of Experimental Psychology, 1939, 24, 542-546.

Following criticisms of the usual laboratory experiments which have sought to validate indices of deception, the author describes a new procedure based on the precise psychological reactions which take place when an individual is forced to lie.

65. Berry, J. L., & Martin, B. GSR reactivity as a function of anxiety, instructions, and sex. Journal of Abnormal and Social Psychology, 1957, 54, 9-12.

GSR conditioning and extinction measures were obtained on 120 college Ss in a factorial experimental design in which twelve treatment groups were divided into two sex groups, three instruction and high-and low-anxiety groups. The three instruction groups were given three different kinds of instructions designed to be (a) apprehension arousing, (b) neutral, and (c) reassuring. The high-and low-anxiety groups were selected as extreme groups on the basis of the Sarason Test Anxiety Scale.

Results indicated that the instructions had opposite effects on the conditionability of males and females. The male Ss tended to show less conditioning when given either neutral or apprehension arousing instruction. The female Ss tended to show the least conditioning with the apprehension-arousing instructions and most conditioning with the reassuring instructions.

There was no relationship between GSR conditioning and the Sarason Test Anxiety Scale. Females showed greater GSR reactivity than males in all phases of the experiment; adaptation, conditioning, and extinction.

66. Bingham, W. E., Jr. A study of the relations which the galvanic skin response and sensory reference bear to judgments of the meaningfulness, significance, and importance of 72 words. The Journal of Psychology, 1943, 16, 21-34.

Subjects were presented with 72 words as stimuli. Galvanic skin response was recorded; subjects rated the words as to their "personal meaningfulness, significance, and importance" (MSI); subjects recorded by symbols the sensory references associated with each word and then judged the MSI of each in contributing to the meaning of the word. Amount of GSR correlated positively (reliably) with the rated amount of MSI, as did amount of significant organic reference. A reliably higher percentage of organic and a reliably lower percentage of visual reference were found for the very MSI words than for the slightly MSI words. "The astonishing fact is that a group of the most intelligent people in our population, university students and teachers, found so much of the sensory background of these words to be of the undefinable, indescribable, untelligible type..."

67. Birnbaum, R. M. Autonomic reaction to threat and confrontation conditions of psychological stress. (Doctoral dissertation, University of California) Ann Arbor, Mich.: University Microfilms, 1964. No. 64-8988.

The present study focuses upon two central issues in psychological stress research; the nature of the stimulus conditions under which stress behavior occurs, and the nature of the personality dimensions predictive of differential reaction to such stressor conditions. Specifically isolated for study are the stimulus conditions of anticipation of a stressor (i.e., threatening conditions) and confrontation with a stressor. A leading question is whether environmental contexts still free of actual trauma, but containing cues that herald such trauma give rise to stress behavior.

The stimulus is a motion-picture film depicting a workday in a machine shop, including scenes of accidental maiming (i.e., finger loss, impalement, etc.). The stressor conditions are prescribed periods within the film: three stressor-confrontation periods and two stressor-anticipation periods. Heart rate and skin conductance are the response systems utilized and were obtained during the time of viewing from 60 first-year college students.

Results indicate that conditions of threat and confrontation are independent sources of stress arousal. Skin conductance and heart rate rise significantly in response to threat conditions. For the skin data especially, reaction was shown to be immediate upon the advent of cues signaling the impending stressor thus supporting the cognitive view of the anticipatory nature of psychological stress reactions.

In response to stressor-confrontation conditions, skin conductance continues to rise while heart rate drops. Such a finding of different directionality of heart response according to stressor condition led to further scrutiny of the literature resulting in the tentative view that heart rate rises when individuals are faced with unknown and unpredictable stressor stimuli (i.e., experience anxiety) and drops when individuals are faced with known and predictable stressor stimuli (i.e., experience fear.)

68. Bitterman, M., & Marcuse, F. L. Cardiovascular responses of innocent persons to criminal interrogation. American Journal of Psychology, 1947, 60, 407-412.

Discussions of the validity of physiological techniques of determining guilt frequently center about the manner in which innocent persons react to the commonly employed relevant-irrelevant method of interrogation. Since relevant questions typically bear obvious relation to the crime under investigation, while irrelevant questions are usually quite devoid of emotional significance, it is often argued that innocent persons with low autonomic thresholds may be expected to show the differential reactions accepted as indicative of guilt. This danger has been recognized by Inbau who suggests methods of avoiding it. To date, however, there has been no systematic study of the initial reactions of innocent persons to questioning. Since investigators have only rarely had opportunity to test more than a small number of persons in any single criminal situation, and since the interrogation must vary with the nature of the crime being investigated, almost no data on the range of individual differences in response are available. The present paper reports the results obtained in the testing of 81 persons involved in a case of theft from which it was possible to derive a reliable classification of the response patterns of innocent suspects and a preliminary statement of the relative frequency with which such patterns may be expected to occur.

69. Bixenstein, V. E. A case study of the use of palmar sweating as a measure of psychological tension. Journal of Abnormal and Social Psychology, 1955, 50, 138-143.

"This study attempts to relate an objective measure of therapeutic progress to similar measures made of the individual's wider life experiences. It demonstrates that PS (palmar sweating), the measure employed, is capable of giving us with relatively small investments of time and money a very meaningful and suggestive picture or replica of a person's ongoing experiences."

70. Bjurstedt, H., & Matell, G. Cardiovascular and respiratory reactions in mental stress. In L. Levi (Ed.), Emotional stress, New York: Elsevier Publisher Company, 1967, Pp. 91-96

The experimental study of man's responses to various environmental stressors may involve emotional influences on the part of the subject depending on how he deals psychologically with fancied or real dangers in the experimental situation. Such influences may greatly affect his cardiovascular and respiratory responses to external stress factors. Some examples of interactions of emotional and physiological responses in environmental stress research are reviewed.

71. Blatz, W. E. The cardiac, respiratory, and electrical phenomena involved in the emotion of fear. Journal of Experimental Psychology, 1925, 8, 109-132.

The only adaptive process that was manifested during the three normal sittings was a reduction in the heart rate in 12 of the 18 subjects. This change was not observed in relation to the cardiac rhythm nor in the electrical conditions. In 4 of 7 subjects there were only slight indications of adaptation as far as respiratory changes were concerned.

The sudden arousal of the emotion of fear, by falling, involves the following changes: (i) Cardiac--(a) an immediate initial acceleration followed by a decided retardation, then a less marked but more prolonged acceleration phase, and finally, a subsequent gradual retardation, (b) an initial augmentation of the force of the heart beat which persists with but slight decrement for longer than 6 minutes, and (c) a marked irregularity of the cardiac rhythm. These changes were observed in all of the subjects. The degree of the change differed with individuals as did the duration of the effect. (ii) Respiratory--(a) an immediately retarded rate in 9 out of 11 records, (b) an increase in the value of the respiratory index above unity in 9 out of 11 records, and (c) an inspiratory stimulus during falling in all cases. (iii) Electrical--striking changes in the electrical conditions of the body in the nature of an increased development of the electromotive force. This effect had a latent period of 0.5 seconds to 3.0 seconds and was prolonged over a period of 1 to 6 minutes. There were no exceptions to the appearance of this phenomenon after falling.

Repetition of the falling, with knowledge of the subject, decreases all of the effects in degree and duration with the exception of the respiratory index which reaches a high level after the second fall in 6 out of 7 cases. The duration of the effects were reduced in all subjects.

Repeated presentation of the stimulus, with knowledge of the subject, exaggerates the adaptive effect.

Anticipation of the stimulus, after having once experienced it, caused an increase in the heart rate in 15 out of 18 subjects.

72. Blau, B., & Blau, T. Pulse rate as a function of ideational stimulation. Unpublished master's thesis, Pennsylvania State College, 1949.

The problem in this study concerned the practicality of using pulse rate as a physiological indicator of involvement in verbal, ideational stimulation. The pulse rate was selected as the physiological variable for investigation because of its apparent stability and availability for recording. Eighteen male subjects were presented with two separate recorded lectures which were designated "interesting", (Lecture I) and "non-interesting", (Lecture II) while the subjects' pulse rates were being recorded on a permanent record.

The following conclusions were evolved from the results of this investigation:

1. No significant difference was found between the total pulse beats of the subjects while hearing Lecture I and the total pulse beats of the subjects while hearing Lecture II.
2. Using the pulse index, a statistic showing the variation of minute-by-minute pulse beats in relation to the number of pulse beats in the one-minute control period immediately preceding either lecture, significant group differences were found for certain one-minute intervals in the two temporally equivalent lectures. Through the use of this analysis, the Lecture I group showed a higher mean pulse index.

3. The standard deviations for subjects' pulse indices tend, generally, to become smaller during Lecture I, while the standard deviations for Lecture II tend, generally, to remain at approximately the same level showing little variation.

4. This investigation tends to indicate that the pulse rate might be employed as an indicator of involvement in ideational situations.

73. Block, J. Personality correlates of GSR responsivity in the lie-detection situation. American Psychologist, 1955, 10, 387. (Abstract)

An internalizing-externalizing dimension appears to underlie the present data. These results support and extend the previous work by H. E. Jones and his collaborators on patterns of emotional expression. In addition, the present findings have implications for the limitations of the lie detector when incautiously employed.

74. Block, J. A study of affective responsiveness in a lie-detection situation. Journal of Abnormal and Social Psychology, 1957, 55, 11-15.

"Seventy Ss, during the course of an assessment program, experienced a lie-detection situation where GSR reactions were recorded. . . Reactors appeared to be more dependent, dreamy, idealistic, and suggestible; nonreactors were evaluated as relatively cool, evasive, opportunistic, and independent. The findings were related to the previous work of Jones, and a reformulation of the notion of externalization-internalization was offered."

75. Block, J. Measurement dimensions in a palmar resistance situation. Psychological Reports, 1962, 11, 319-331.

As an empirical means of establishing the primary measurement dimensions in a palmar resistance situation, 22 skin resistance measures taken during a complex psychological situation (a film) were factor analyzed. Seven orthogonal dimensions, which subsumed almost all the significant variance, were extracted. The seven factors were labelled, tentatively, as General Resistance Level, Reactivity To The Film, Involvement In The Film, Phlegmatism, Resistance Peak When Uninvolved, Spontaneous GSRs, and Lowest Resistance Reached At Any Time. A simple way of regression adjusting a score proved to be as effective as a more cumbersome method. The factor dimensions found appear to have some general applicability and have already received some cross-validation. Accordingly, researchers employing the palmar resistance technique may find useful the measures here proposed as relatively pure factorial indices.

76. Bode, D. L., & Brutten, E. J. A palmar sweat investigation of the effect of audience variation upon stage fright. Speech Monographs, 1963, 30, 92-96.

Thirty-six male students read a 408 word prose passage 6 times. The 1st 4 trials were before 1 listener, the E. The 5th and 6th trials were before intensional audiences of peers or faculty members supposedly seated behind a 1-way mirror. It was found that stage fright declined with successive oral readings before the same external audience but this effect was lost when the audience situation was changed. Variation in intensional groups of peers or faculty members did not produce significantly different effects of stage fright.

77. Bogdoff, M. D., Back, K. W., Klein, R. F., Estes, E. H., Jr., & Nichols, C. R. The physiologic response to conformity pressure in man. Annals of Internal Medicine, 1962, 57, 389-397.

Nine groups of 4 subjects each were studied during the task of making an individual judgemental decision in the presence of the group.

The characteristics of the group interaction and the ability of each individual were created by the experimenters. The degree of psychophysiologic response was measured by changes in plasma free fatty acid levels during periods of the experiment.

The quality of the different group interactions did significantly modify the degree of arousal.

The tendency for the individual to behave like the others of the group (conform or copy) varied significantly between groups and bore direct relationship to the intensity of the psychophysiologic response.

The implications of these studies for the homeostatic integrity of the organism are indicated.

78. Bogdoff, M. D., Combs, J. J., Jr., Bryant, G. D., & Warren, J. V. Cardiovascular responses in experimentally induced alterations of affect. Circulation, 1959, 20, 353-359.

Although alterations in emotional arousal have long been associated with changes in cardiovascular dynamics, the precise quantitative relationship has not been fully detailed. Independent assessment of the emotional change was felt to be a necessary component of a quantitatively oriented study. The variously described responses for "anxiety" and "anger" might better be re-explored in such a manner. The emotional arousal was experimentally produced in the laboratory. Measures of pulse, arterial blood pressure, and cardiac output were conducted both before and during the change in affect evoked by the laboratory stimulus.

79. Bose, S., & Banerjee, S. N. A psychogalvanoscopic study into the reported emotions of university sophomores. Indian Journal of Psychology, 1966, 41, 77-83.

A normative study of psychogalvanoscopic responses of 20 male and 20 female students to stimuli categorized as startle, anger, fear, sexual, pleasure, and pain arousing was made. Significant differences were found between the 2 groups of Ss for the startle, anger, and fear stimuli, but not for the other 3 kinds. Intercorrelations are also presented separately for the 2 groups.

80. Botto, P. W. False heart rate feedback: Behavioral, physiological, and personality correlates. Unpublished master's thesis, The Pennsylvania State University, 1969.

Four experiments were conducted to study the behavioral, physiological, and personality effects of false heart rate feedback. These experiments were based on a paradigm advanced by Valins. In which it was stressed that the mere belief that one's heart beat is changing regardless of actual physiological changes is sufficient to affect behavior. There were four experiments involved: (1) a replication of Valins' original study with a closer examination of actual physiological responses occurring, (2) a more economical and efficient paradigm for further research and practical application, (3) an examination of the role which subject attention plays in the original paradigm, and (4) examination of a possible personality factor (Sex Guilt) which may account for response variation. It was concluded that what Valins ascribes to merely the belief that physiological actions were occurring may have, in fact, been due to actual physiological changes precipitated by a general attention factor. Further more, it was concluded that Sex Guilt may serve as a moderator variable in determining behavioral and physiological responding.

81. Botto, R. W., & Stern, R. M. False heart rate feedback: The relationship of choice behavior to true EKG and GSR. Paper presented at the annual meeting of the Society for Psychophysiological Research, Washington, D. C., October 1968.

The author proposes that the cognitive factors of a situation dictate the subjects interpretation of perceived physiological reactions. Ten male subjects viewed 10 slides of "Playboy" foldouts while hearing false heart beat feedback, in a replication of Valins' 1966 experiment. GSR and EKG were measured. In general, Valins' findings were replicated, i.e., preference for slides was influenced by the false feedback. Two further studies are described that contradict Valins' findings by showing distinct physiological differences between a condition of an increase in heart beat and a condition of increase in extraneous sound. It is suggested that these differences are closely associated with the degree of attention paid the stimulus.

82. Boulougouris, J. C., Marks, I. M., & Marset, P. Superiority of flooding (implosion) to desensitisation for reducing pathological fear. Behaviour Research & Therapy, 1971, in Press.

Flooding was compared to desensitisation as a fear-reducer in 16 phobic patients who were treated in a crossover design with 6 sessions of each procedure. Flooding was significantly superior to desensitisation on clinical and physiological measures and improvement has been maintained over nine months followup. Flooding is a promising technique for the reduction of fear in anxious phobic patients and may shed light on basic mechanisms which maintain fearful behaviour.

83. Boyd, R. W., & DiMascio, A. Social behavior and autonomic physiology. Journal of Nervous and Mental Disease, 1954, 120, 207-212.

A 34 year old patient was studied by means of a sociologic and physiologic method. The former employed the Bales scoring technique and the latter, a polygraph that recorded simultaneously heart rate, galvanic skin response and skin temperature. Their interrelationships and possible use in diagnosis and prognosis in psychotherapy are discussed.

84. Brehm, M. L., Back, K. W., & Bogdonoff, M. D. A physiological effect of cognitive dissonance under stress and deprivation. Journal of Abnormal and Social Psychology, 1964, 69, 303-310.

An experiment and a partial replication were conducted to relate the change of motivation due to dissonance reduction and commitment to physiological changes. The experimental technique was based on food deprivation studies by Brehm which showed that already deprived individuals who committed themselves to further fasting under conditions of low reward decreased their self-estimates of hunger, while the reverse was true for those given high rewards. The data suggest that a person who has convinced himself that he is not so hungry tends to respond physiologically as if he were not hungry.

85. Bridger, W. H., & Mandel, I. J. A comparison of GSR fear responses produced by threat and electric shock. Journal of Psychiatric Research, 1964, 2, 31-40.

The acquisition and extinction of GSR fear responses were compared in 20 normal human Ss using a CS-UCS paradigm. One-half the Ss were reinforced with electric shock; the remaining one-half acquired the response under verbal threat of shock. For all Ss extinction consisted of removal of the shock electrodes and instructions that shock would not be administered. The results demonstrated that while there was no difference in the overall performance of the groups during acquisition, the shock group showed greater resistance to extinction. The results were interpreted to indicate that behavior based on intellectual knowledge follows different laws as opposed to behavior based on direct experience.

86. Brown, B. B. Recognition of associations between aspects of consciousness and EEG frequencies using colored lights operated by specific EEG components. Paper presented at the meeting of the Society for Psychophysiological Research, Washington, D.C., October 1968.

Following the first or second experimental session, the subjects were asked to sort 105 descriptors of mood and feeling, describing their subjective feelings when each of the 3 colored lights was lighted by their own alpha, beta, or theta activity. As a control, 45 subjects not participating in the study were asked to sort the same descriptors to the colors red, blue, and green. Both the experimental and control group could also sort the descriptors to "no color" association.

Analysis of results revealed at least 2 classes of descriptors: those specific to EEG frequency independent of color (e.g. calm to α , afraid to β), and those predominantly associated with color (e.g. excited to red, sad to blue).

87. Brown, B. B. Recognition of aspects of consciousness through association with EEG alpha activity represented by a light signal. Psychophysiology, 1970, 6, 442-452.

Subjects were instructed to attempt identification of feeling states which would keep on a blue light operated by EEG alpha activity. A closed physiologic feedback system was used and no stimuli external to the circuit were employed. A highly significant degree of enhanced alpha activity was achieved in the first practice session, and 60% of the subjects showed specificity of the response to the light signal situation as compared to the same situation without the light signal. Greatest achievement of enhanced alpha activity appeared to be related to narrowing of perceptual awareness and pleasant feeling states.

88. Brown, B. B. Awareness of EEG-subjective activity relationships detected within a closed feedback system. Unpublished manuscript, Veterans Administration Hospital, Sepulveda, California and Department of Psychiatry and Human Behavior, U. C. I. College of Medicine, Orange, California, undated.

When their alpha, beta, and theta EEG frequencies were displayed as light signals of different colors, naive subjects quickly related quantifiable sets of subjective activities with each of the EEG frequency ranges within a single 60 minute practice session. Instructions were to relate inner feelings with any or all of the light signals. Written descriptions of the experience from one subject group were compared to evaluations of subjective activity obtained by a color Q sort technique used in a second experiment. The latter was controlled for effects of color and for effects of the EEG-feedback experience. Results established 2 sets of relationships with subjective activity: color and EEG frequency range; each set could exist independently or in relationship to each other. The study isolated several attributes which characterized the learning of subjective-biological relationships in this feedback system, i.e., generation of "stimulus" and the "response" were both internal events; both reinforcement of the process and the behavior reinforced were selected by subjective activity of the subject; and the positive reinforcement did not occur without effort by the subject to define it.

89. Brown, L. B. Religious belief and skin conductance. Perceptual and Motor Skills, 1966, 23, 477-478.

The GSRs to sets of religious and secular words of religious believers and disbelievers were compared. No differences in responsiveness between groups or between sets of words were found. The main effect was within persons, suggesting that the arousal value of the stimuli was specific to each individual.

90. Brown, T. E. The relationship between surface temperature and social traits in young children. The Journal of Genetic Psychology, 1939, 55, 401-413.

Having determined, in two preliminary experiments, that, with certain modifications, the "Dermatherm" was adequate and reliable for measuring surface temperature, and that nursery children were receptive to its use, the relationship between surface temperature and social traits was studied, resulting in the following conclusions:

- I. There is a positive relationship between pack of hand temperatures and sociability, emotional control, ease of social adjustment, attractiveness of personality, and effective energy.

2. There is little relationship between back of hand temperatures and mental effectiveness, skill in work and play, ascendance-submission, or scores on intelligence.
 3. Temple temperatures do not appear significant as indicators of the traits studied.
 4. Temple-hand gradients show essentially the same relationship to social traits as do hand temperatures.
 5. Instances of emotional control were accompanied by increased hand temperature, while those of non-controlled emotions were accompanied by a decrease.
 6. It was suggested that the heat of back of hand surfaces might be significant as an indication of the degree to which energy production in the body exceeds the internal needs and as an index of the excess energy available for functions less necessary for organic adaptation, such as would be expected in social behavior.
91. Buck, R. W. Differences in social learning underlying overt-behavioral, subjective, and physiological responses to emotion. Paper presented at the meeting of the Midwestern Psychological Association, Detroit, May 1971.

Disagreement between different kinds of emotional responses may stem from differences in their "visibility" during social learning. "Visible" overt responses are available for the fine discrimination learning, while relatively "invisible" physiological responses are modified via classical conditioning. To illustrate, some sex differences in overt and physiological responding during emotion are reviewed.

92. Buck, R., Miller, R. E., & Caul, W. F. Heart rate and skin conductance responding during three attention-direction tasks. Psychonomic Science, 1969, 15, 291-292.

Subjects were instructed to turn their attention toward: (1) feeling their internal bodily events (BODY task); (2) remembering events that happened to them on the preceding day (COGNITIVE task); and (3) looking at a series of slides, which had interesting but not arousing content (EXTERNAL task). They were assured that no verbal report would be required. Cardiac deceleration occurred during the BODY and EXTERNAL tasks. The BODY task was associated with a decrease on skin conductance measures.

93. Buck, R., Parke, R. D., & Buck, M. Skin conductance, heart rate, and attention to the environment in two stressful situations. Psychonomic Science, 1970, 18, 95-96.

Physiological and behavioral responses to two stressful situation were studied in the context of an experiment on affiliation. Male Ss were threatened with either the prospect of electric shock or the prospect of sucking on infantile oral objects. The threat of shock was associated with an increase in both skin conductance and heart rate and in a decrease in looking around the room. The threat of sucking on infantile objects was associated with an increase in skin conductance, heart-rate deceleration, and an increase in the duration of looking around the room.

94. Buckhout, R. Changes in heart rate accompanying attitude change. Journal of Personality and Social Psychology, 1966, 4, 695-699.

The experiment explored the relationship between changes in heart rate which accompany exposure to countercommunications and subsequent attitude change. Heart-rate data were recorded while Ss engaged in a structured interview in which they were verbally reinforced for choosing to read aloud statements opposite to their initial attitude. Ss whose net attitude change scores were in the direction of the reinforcement were significantly higher in initial base-line heart rate and degree of heart-rate increase than anticonformers and showed a significant decrease in heart rate during the interview. Anticonformers were lower on all heart-rate measures, showing a maintenance of heart-rate arousal during the session. It was tentatively concluded that attitude change in response to social influence is accompanied by heart-rate decline.

95. Buckhout, R. Autonomic reactivity in social roles: The managing of emotion. Paper presented to the annual convention of the Psychonemics Society, Chicago, October 1967.

The overriding hypothesis tested was that people would manage their cognitive and emotional resources differentially in three roles designated by the experimental set. Specifically:

1. Fear: It was predicted that communicators would employ more fear in trying to persuade a receiver to take a chest x-ray than they would in the instruct or inform roles.
2. Omissions-Censoring: It was predicted that communicators would omit more often when instructing or giving their own opinion than when persuading.
3. HR: It was predicted that HR would be highest in the persuade role situation.
4. Phasic EDR's: It was predicted that the frequency of spontaneous EDR's would be higher in the instruct and inform conditions than in the persuade conditions.

As predicted, the use of fear was greatest for the persuade role (61% of the choices). Next highest was the instruct role (42%), with own opinion (inform) role (a control condition) showing the least use of fear (27%). These differences are significant.

The inform role produced the largest number of omissions (26% of the time); a figure significantly larger than the omissions in the persuade role, as predicted. Omissions in the inform role did not differ significantly from those in the persuade role, however.

As predicted, the analysis of variance showed that the HR was significantly higher in the persuade condition ($p < .01$), but the interaction mean square for roles vs. trials was non-significant, suggesting, that the patterns for energy mobilization were the same in each role. The significant main effect was primarily a function of the obvious "overpreparation" by the communicator's anticipating the persuade role.

The analysis of variance for EDR data showed a significant difference between the three roles ($p < .01$); with persuaders showing significantly less phasic EDR activity than in the instruct or inform conditions. A significant roles X trials interaction term suggests that the pattern of phasic EDR's which obviously differs with role, was changing with respect to the presentation of stimuli.

96. Buckhout, R. Managing emotion: Personality and social role determinants of emotional responses. Unpublished manuscript, The University of California, 1969.

Abstract and concrete information processors attempted to persuade another person to take a chest X-ray in three counter-balanced conditions: (1) a structured interview with paced stimulus materials (simple environment); (2) an unstructured interview (complex environment); (3) a control condition where Ss gave their own opinion about the stimuli with no receiver present.

The results suggest that a person's orientation toward information processing (degree of cognitive complexity) interacts with situational complexity to produce a stable tonic HR level when the two are mismatched and habituation in HR when cognitive and situational complexity are symmetrical. Abstract Ss showed higher HR variability while concrete Ss, evidencing more emphasis on external stimuli, showed more EDR variability.

The results are discussed in the context of a theory of emotional management in social encounters.

97. Buckhout, R., & Grace, T. The effect of food deprivation and expectancy on heart rate. Psychonomic Science, 1966, 6, 153-154.

Ss fasted for 24 hr. after being on a controlled diet. Group A expected to fast 24 hr. and had HR measured with food cues present. Group B expected to fast for 36 hr. and were tested without food cues. At the 24 hr. mark, Group A showed significantly higher heart rate. It was concluded that significant HR arousal occurs in deprived human beings anticipating immediate satiation.

98. Buckhout, R., Jackson, R., & Bartholomew, H. Personality determinants of emotional responses: Need for social approval. Paper presented at California State Psychological Association Meetings, January 1970.

The purpose of this experiment was to study psychophysiological and cognitive indices of emotion in a persuasion situation on the part of persons high or low in the need for social approval (NSA). Need for social approval is regarded as an index of a person's willingness to conform to perceived situational demands, and specifically has been shown to be positively related to attitude change. In the present study, high and low NSA S's advocated a counter-attitudinal (dissonance-evolving) position to another person, while receiving positive or negative reinforcements from judges.

High NSA S's showed significantly higher HR and HR variance than low NSA S's in the negative condition and higher mean HR in the positive condition. Low NSA S's showed significantly higher Δ EDR and Δ EDR variance than high NSA S's in both positive and negative conditions.

99. Bunney, W. E., Jr., Mason, J. W., & Hamburg, D. A. Correlations between behavioral variables and urinary 17-hydroxycorticosteroids in depressed patients. Psychosomatic Medicine, 1965, 27, 299-308.

This paper presents a study of the relationship of urinary 17-hydroxycorticosteroids (17-OHCS) to behavioral variables in depressed patients. Longitudinal behavioral ratings of depression and anxiety showed high positive correlations with 17-OHCS levels when analyzed over time for a given patient. However, if mean depression ratings and mean 17-OHCS levels were taken for each of the 17 patients studied, a significant positive correlation was not obtained. This is accounted for by one group of the patients who showed low 17-OHCS levels and high depression ratings. Two subgroups of patients were identified in terms of corticosteroid levels. The data suggest that those with high 17-OHCS levels were often more aware of and involved in the struggle with their illness, while many with high depression ratings and low 17-OHCS levels showed extensive denial of their depression. Behaviorally stable patients ran stable 17-OHCS levels, while patients with fluctuating behavior showed fluctuating 17-OHCS levels.

100. Burack, B. A critical analysis of the theory, method, and limitations of the "lie detector". Journal of Criminal Law, Criminology & Police Science, 1955, 46, 414-426.

1. The machine used in polygraph work is extremely accurate mechanically and is probably almost as good now as it ever will be.

2. This machine measures only physiological functions and any sudden changes in these functions.

3. These physiological changes in an interrogation test-situation undoubtedly reflect the arousal of emotion.

4. The "undisguised questions test," with or without various controls, has little logical validity.

5. The "disguised questions test," when used for a person who could not reasonably be expected to be familiar with certain details of the offense, has logical validity.

6. The commercial, governmental, and scientific "lie detection" examiners still have no accepted standards of educational and training requirements for competency.

7. There is still a fairly common insensitivity to certain unethical practices in polygraph work.

101. Burdick, H. A., & Burnes, A. J. A test of "strain toward symmetry" theories. Journal of Abnormal and Social Psychology, 1958, 57, 367-370.

Two studies have been reported which offer some support to the "strain toward symmetry" hypothesis. GSR deflections were found to be associated with disagreement with a positively valent experimenter. Two topics were used as matters for disagreement, but we were unable to discover significant differences in the deflections associated with the topics used.

In the second experiment, the attractiveness of the person serving as a source of communication was directly manipulated. Subjects who reported that they "liked" him tended to change their opinions toward more agreement with him. When they were subsequently induced to "dislike" him, they tended to change their opinions toward greater disagreement. Evidence is presented that this change of opinion is related to need for affiliation.

102. Burgess, M. M., & Hokanson, J. E. Effects of autonomic arousal level, sex and frustration on performance. Perceptual and Motor Skills, 1968, 26, 919-930.

This paper investigates the effects of initial heart rate level (Drive), sex and frustration on symbol-matching performance. Low (LD), moderately low (MLD), moderately high (MHD), and high (HD) heart-rate Ss worked on a modified digit-symbol problem before and after a frustration or no-frustration manipulation which raised heart rate on the average 20.6 and 2.96 beats/minute respectively. The results show that MHD and HD Ss complete significantly more matches initially than LD and MLD Ss by manifesting both shorter response and inter-trial interval latencies. Furthermore, frustration induced autonomic arousal facilitates performance improvement for LD and MLD Ss and decelerates performance improvement for MHD and HD Ss. Frustration-induced arousal exerts this effect by altering response latency only. No sex differences were observed.

103. Burstein, K. R., Fenz, W. D., Bergeron, J., & Epstein, S. A comparison of skin potential and skin resistance responses as measures of emotional responsivity. Psychophysiology, 1965, 2, 14-24.

The purpose of this study was to compare gradients of skin resistance (SR) and skin potential (SP) responses generated by differing degrees of psychologically disturbing stimuli, and to determine the significance of the different wave forms of skin potential.

SR and SP were simultaneously recorded during a word-association test that included three levels of psychologically disturbing verbal stimuli.

In addition to the a and b waves of the SP response, a second negative wave form, a₂, was recorded.

SR and all SP wave forms yielded positive gradients as a function of increasing stimulus intensity. Gradients based upon SR and total SP were close to identical. Magnitude measures, which include zero responses, of the SP wave forms yielded steeper gradients than measures of amplitude or frequency. The relative contribution of different SP wave forms to total SP varied with stimulus level.

104. Burt, H. E. The inspiration-expiration ratio during truth and falsehood. Journal of Experimental Psychology, 1921, 4, 1-23.

The inspiration/expiration ratio (I/E) was recorded with an improved technique while the subject was lying (L) or telling the truth (T). The average I/E for the 3 to 5 breaths following the subject's answer was subtracted from the average I/E for the 3 to 5 breaths between the experimenter's question and the subject's reply. The hypothesis under investigation was that this difference (Di) should be negative for L and positive for T. In some instances instead of Di, the I/E for the single breath immediately following the subject's answer was subtracted from the I/E for the breath immediately following the experimenter's question (Ds). Systolic blood pressure was measured at intervals.

The material consisted in the first series of cards containing letters and numbers with L and T trials in a random order. The second series was similar except that L's at a given sitting all occurred in succession and the T's likewise. The third series involved imaginary crimes with the subject fabricating an alibi or recounting one prepared by an assistant. The fourth series was the same as the third except that a 'jury' was present.

Systolic blood pressure had a greater diagnostic value than the breathing. In the last series it correctly indicates which of the two crimes is L in 91 percent of the cases as compared with 73 percent for the breathing. The two criteria correspond appreciably more than half the time and if effort is made to quantify the measures the correlation is around .50.

The lying consciousness appears to have an emotional (probably fear) content and it is possible to influence expressive measurements somewhat by emotional control. Some subjects successfully raise their blood pressure during T by imaginary emotions. It is thus important to have other criteria as a check.

C

105. Calvin, A. D., McGuigan, F. J., Tyrell, S., & Soyars, M. Manifest anxiety and the Palmar perspiration index. Journal of Consulting Psychology, 1956, 20, 356.

On the basis of our findings and other studies of anxiety the following hypothesis is proposed: The A scale and the PPI measure two different facets of behavior. Where anxiety is of a temporary "ego-involved" situational nature, the appropriate measure of drive is the PPI. Conversely, where anxiety is a stable permanent personality characteristic of the individual the appropriate measure of drive is the A scale.

106. Cameron, D., Levy, L., Rubenstein, L. D., & Malmö R. B. Repetition of verbal signals: Behavioural and physiological changes. American Journal of Psychiatry, 1959, 115, 985-991.

"We have studied the effects of repetition on certain aspects of the behaviour of the individual, notably his attitudes, interpersonal relations and his self concept. We have also studied the effects of repetition on ear temperature levels. With respect to the behavioral changes it has been demonstrated that repetition will produce predetermined change. In the psychosomatic studies, repetition will produce change but not necessarily in a predetermined direction. Behavioral changes have been demonstrated for over a year after cessation of repetition in several cases in which the circumstances were very favorable. The changes in the ear temperature levels faded within a few days after cessation of repetition."

107. Campos, J. J. The effects of verbalization instructions and scaled intensities of pleasant and unpleasant stimulation on physiological activation. (Doctoral dissertation, Cornell University) Ann Arbor, Michigan: University Microfilms. 1966, No. 67-1451.

This experiment investigated the relationship of degree and intensity of affect and of instructions to verbalize on physiological response. First of all, it attempted to determine whether the assumption of an emotional state as lying on an activation dimension is justified. That is, would emotional stimulation produce significant increase in physiological response? Secondly, it aimed to determine whether one emotion would produce significantly greater activation than another in a given physiological response. Third, would different degrees of intensity of judged emotion produce different degrees of physiological response? Fourthly, how does an effort variable differ from emotional variables in producing physiological change? Will the effort variable cause increase in all physiological responses while the emotional variable does not?

Degree and intensity of affect were operationalized by having judges scale "Peanuts" cartoons and scenes from the film "Death on the Highways." Six categories of stimuli were constructed: very pleasant, pleasant, slightly pleasant, slightly unpleasant, unpleasant, very unpleasant. The stimuli were then presented to subjects (N=40), half of whom were instructed to describe the stimuli after they were turned off, and half who were not so instructed. The stimuli were then rated by each S at the end of the experiment, and it was this rating for each S that served as the affect and intensity independent variables. Because Ss tended to rate some of the blocks of stimuli equal in affect the intensity variable ultimately had two levels, rather than three.

Response measures used were skin conductance difference scores, maximum skin conductance level scores, heart period difference scores, heart period level scores, log heart period variability, blood volume difference scores, respiration rate level scores and respiration amplitude difference scores.

108. Campos, J. J., & Johnson, H. J. Affect, verbalization, and directional fractionation of autonomic responses. Psychophysiology, 1967, 3, 285-290.

An experiment was designed to evaluate the effects of pleasantness and unpleasantness and instructions to verbalize on directional fractionation of autonomic response. Degrees of pleasant and unpleasant stimulation were presented to Ss under two verbalization instruction conditions. Something like directional fractionation was found for the very unpleasant no-verbalization condition only, but the pattern disappeared upon the addition of a later verbalization requirement. More generally, it was found without exception that conditions of no verbalization are accompanied by cardiac deceleration, regardless of degree or of quality of affect, while later verbalization conditions produce cardiac acceleration, again regardless of degree or quality of affect. The authors conclude that verbalization instructions are important for determining the degree and direction of cardiac activation.

109. Carter, H. L. J. A combined projective psychogalvanic response technique for investigating certain affective processes. Journal of Consulting Psychology, 1947, 11, 270-275.

An incomplete sentence test was combined with a psychogalvanic response technique to study affective processes. One control group and 2 experimental groups were studied. Measures of change in palmar skin resistance and reaction time differentiate the experimental groups from the control group. Oral responses of individuals in the 3 groups vary little except for responses listed as "social positive" and "unclassified." It is concluded that this technique "used with adequate interviewing procedures is of value not only as a means of discovering areas of emotional conflict but is of value also as a means of determining the relative importance of these areas."

110. Cattell, R. B. The significance of the actual resistances in psycho-galvanic experiments. British Journal of Psychology, 1928, 19, 34-43.

It appears that the actual resistance is independent of the temperature and humidity of the air, but the fall of resistance during accommodation decreases with increase of temperature. The initial and final resistances vary together, but the latter are the more affected by environmental conditions. There is a constant resistance level for a given attitude or mode of behavior, which is affected temporarily by small stimuli; acute disturbances may result in the adoption of a new attitude with a new resistance level. The resistance of an individual varies directly as the "available instinctive energy" and inversely as the "extent of release of energy taking place in consciousness." The resistances of different individuals are directly proportional to the extent of conflict experienced and suppression exercised by each.

- III. Cattell, R. B. Experiments on the psychical correlate of the psychogalvanic reflex. British Journal of Psychology, 1929, 19, 357-386.

Some maintain that the psycho-galvanic reflex indicates emotion, others consider that it indicates conation. It is, on the other hand, possible that the reflex is related to the functioning of some one or two instinctive dispositions. The present research is an attempt to solve the problem. Ten subjects were used, each observing for about 16 hours and giving reflex responses to 96 various stimuli. In about a quarter of the experiments the subject was given some work to do, such as adding 7's aloud or spot dotting. There appears to be some correspondence between "force of character" and magnitude of deflection, while irritation, moods, worry and discomfort produce maximum responses. Conative experiences gave the largest deflections, cognitive the least; deflections associated with affective experiences were of intermediate size. The general shapes of the curves seemed to be relatively independent of the stimulus. Each

subject had a typical curve shape under certain conditions, though each varied in apparently the same way as an effect of change of mood or of subjective condition. In carrying out any activity the deflections were proportional to the effort involved, not to the work done. The paper concludes with a resume of previous work on the psychogalvanic reflex, and a discussion of the total results.

112. Cattell, R. B. Personality and motivation-structure and measurement. New York: World Book Company, 1957.

While this book covers a broad spectrum of measurement techniques related to motivation, there is some material relating physiological variables to attitude. For example in a list of items considered for measuring motivation the following physiological variables are reviewed:

1. Autonomic responses: psychogalvanic reflex, magnitude of reflex and magnitude of drift. The magnitude of response to threat to an interest is proportional to interest strength. It is proposed to examine now both (a) the immediate reflex and (b) the magnitude of drift, i.e., extent of the failure of the resistance to return to normal 20 seconds after the stimulus.

2. Autonomic responses: muscle tension. Increase of muscle tension has been explored as an indicator of interest; presumably it would behave like the P. G. R. being most nearly proportional to threat.

3. Autonomic responses: metabolic rate change. Like the other autonomic measures, this is susceptible to testing, both for strength of interest directly stimulated and for threat to interest. However, because of cumbersomeness of breathing apparatus the M.R. has been only estimated from pulse and stroke volume.

4. Autonomic responses: cardiovascular measures. A variety of cardiovascular measures were made, as now possible through the heartometer, including pulse rate, the two blood pressures, systolic amplitude, diastolic amplitude, diacrotic notch level, etc., as worked out by Cureton.

5. Autonomic responses: peripheral circulation, finger temperature. It is conceivable that certain patterns of autonomic response are more diagnostic of strength of interest than others, and finger temperature drop has proved particularly useful as a "frustration of attitude" measure.

113. Cattell, R. B., Heist, A. B., Heist, P. A., & Stewart, R. G. The objective measurement of dynamic traits. Educational and Psychological Measurement, 1950, 10, 224-228.

A report of research designed to further demonstrate more valid and objective means of measuring the strength of an individual's attitudes, interests, and of his dynamic traits generally, than "by asking him how strong they are."

114. Cattell, R. B., Maxwell, E. F., Light, B. H., & Unger, M. P. The objective measurement of attitudes. British Journal of Psychology, 1949, 40, 81-90.

1. On the assumption that advance in the measurement of motivation, and dynamic traits generally, requires not so much concentration on statistical scaling refinements of present verbal methods as more psychological ingenuity in devising varied methods based on psychodynamic principles, some twenty-five methods, mostly new, have been suggested.

2. The examination of sixteen of these methods, ten being described in the present paper, shows that nine of them--Time Expenditure, Money Expenditure, Preference, Information, Speed of Decision, Distraction, False Belief, Opinionnaire Methods and Projection--have significant validity. Two--Psychogalvanic Reflex and Immediate Memory--have promising validity but need re-analysing in regard to curvilinear relationships and the effect of specific ego threat in the stimulus. Five methods--Misperception, Fluency, Speed of Reading, Writing Pressure and Pulse Pressure--failed, as administered here, to show any validity, but suggestions for improving the last two have been made.

For the present, however, concentration on the validity is more important than concentration on the non-validity. Only through exploration of new methods, and the raising by further research concentrated on detail, of the validity demonstrated in the above methods, can psychology hope to provide those objective attitude measures sorely needed to permit progress in economics, social psychology and the social sciences generally.

115. Cattell, R. B., Radcliffe, J. A., & Sweeney, A. B. The nature and measurement of components of motivation. Genetic Psychology Monographs, 1963, 68, 146-154.

The researches here reported have investigated the structure of components among objective measures of motivation strength in children. They have compared that structure with what can be inferred from a critical evaluation of previous findings in the adult realm and validated several new principles of measurement.

A motivation strength measurement has been operationally defined in a way which distinguishes it from the other two trait modalities--abilities and general temperment traits. "Objective" has been defined not merely as conspactive, i.e., objective in scoring, in the sense that two scorers will see the response as getting the same value, but objective in the sense that the subject's response is not introspective self evaluation, as in an inventory. Instead it is behavior in which the subject does not know on what parameter of his response he will actually be scored.

Including the adult devices, over 65 different principles for objective measurement of motivation have been evaluated. They extend over learning phenomena, misperception ("projective") effects, memory, physiological response, etc., covering any principle that psychologists have experimented with or seriously proposed. Nonobjective (opinionnaire, preference) devices were also introduced in one or two forms to establish continuity with traditional, sociological approaches and to "place" the validity of these among the objective devices.

116. Cattell, R. B., & Warburton, F. W. Objective personality and motivation tests. Urbana: University of Illinois Press, 1967.

In this work, attitude is regarded as a unit of motivation. Among the tests reviewed as measures of motivations (attitude), a number are physiological. The latter include: systolic and diastolic blood pressure, PGR, muscle tension, etc.

117. Chalke, F. C. R., Wake, R. F., & Lawless, J. C. Preliminary investigation of techniques for psychophysiological measurement. Progress Report, Nov. 1965, PCC-E41-93-01-01. Research Division, Dept. of Psychiatry, National Defense Medical Centre, Ottawa, Canada.

The purpose of this study is to carry out an investigation of techniques for psychophysiological measurement of responses to specific stimuli in the areas of activation, anxiety, and emotional reactivity. The parameters under investigation are the galvanic skin response (GSR), heart rate (HR), pupillary response (PR), and respiration. Specifically, interest is centered about the PR and its relationship to the other physiological parameters.

118. Champion, R. A. Studies of experimentally induced disturbance. Australian Journal of Psychology, 1950, 2, 90-99.

Three experiments were made on the conditions and measurement of experimentally induced disturbance, with the GSR as an index.

1. Disturbance was created in 24 Ss under conditions of no movement, non-adaptive movement and adaptive movement. Recovery from the disturbance was faster with adaptive movement than with no movement.
2. Stress was induced in 12 Ss, 6 of whom then took part in general discussion about the disturbance whilst 6 merely rested. The former showed less disturbance in an after test.
3. One hundred GSRs following strong electric shock were recorded and represented in terms of three units, viz. RQ_8 , RQ_{10} and change in conductance, in order to validate the units against the criteria of independence and normality. Only the two RQ units proved acceptable.

Attitude is an important factor in the explanation of the first two results; all three experiments provide evidence that the RQ is a valid and useful means of expressing the GSR.

119. Champion, R. A. The calibration of the galvanic skin response as an indicant of a psychological dimension. Australian Journal of Psychology, 1951, 3, 99-108.

The problem discussed is generally recognized as the establishment of an appropriate unit for the measurement of the GSR. The psychologist, however, is not concerned with the measurement of the GSR in itself, but aims instead to use it as an indicant of some psychological dimension. Proper measurement of the GSR, in this sense, probably depends upon the kind of dimension thought to be indicated. The basic problem is the discovery of the law relating the GSR and the psychological dimension, i.e., the calibration of the GSR. The commonest criteria of an appropriate unit, viz., normality of distribution and independence of basal level, should be viewed in the more general context of useful measurement, and replaced by tests of the assumptions underlying the use of the various scales of measurement. Any test of these assumptions is a method of calibrating the GSR, although the significance of calibration depends upon whether the indicated dimension is observable or hypothetical. The current

method of calibration, i.e., of establishing an appropriate unit for the measurement of the GSR, demands questionable assumptions. These are avoided in an alternative method which involves systematic, instead of random, variation of some relevant feature of the stimulus situation.

120. Chant, S. N. F., & Salter, M. D. The measurement of attitude toward war and the galvanic skin response. Journal of Educational Psychology, 1937, 28, 281-289.

This study is an investigation of the relationship between attitudes as measured by the "Attitude Toward War Scale," Form A, constructed by D. D. Droba and edited by L. L. Thurstone, and the galvanic response, which has frequently been employed as a measure of emotional response. The general belief that attitudes are highly emotional is not born out by this study.

121. Chapman, L. J., Chapman, J. P., & Brelje, T. Influence of the experimenter on pupillary dilation to sexually provocative pictures. Journal of Abnormal Psychology, 1969, 74, 396-400.

Two Es with markedly different personality characteristics and styles of interacting with Ss tested male undergraduates (N=22 and 25) for pupillary dilation to nude and partially clothed women, as well as to pictures of men and to control pictures. The Ss of E₁, an aloof and businesslike graduate student, dilated equally to male and female pictures. The Ss of E₂, a casual outgoing undergraduate, dilated more to pictures of women than to those of men. These results indicate that pupillary dilation to sexually provocative stimuli, reflect in part, S's relationship to the examiner and his view concerning permissible emotional responses to the stimuli.

122. Chatterjee, B. B., & Eriksen, C. W. Conditioning and generalization of GSR as a function of awareness. Journal of Abnormal and Social Psychology, 1960, 60, 396-403.

This study was essentially a replication of the Lacey and Smith (1954) experiment on the unconscious conditioning of autonomic responses. When their methods of data analysis were used, their results in general were confirmed. However, due to a more extensive and careful investigation of the Ss' awareness in the present study, it was possible to show that the conditioning of the autonomic response (GSR) was no more specific than the Ss' verbalizations. It was also shown that the method employed by Lacey and Smith to compute conditioning gives rise to a spurious conclusion of precise autonomic conditioning without verbal awareness. The limitations of their basic design for investigation of the problem of unconscious conditioning were pointed out.

123. Church, R. M. The effect of competition on reaction time and palmar skin conductance. Journal of Abnormal and Social Psychology, 1962, 65, 32-40.

Ninety-two subjects were tested on reaction time tasks under normal and competitive conditions. The speed of the simple reaction and of the discriminative reaction increased under the competitive condition. Although the competitive condition resulted in differential reinforcement for fast responses, this differential reinforcement could not account for the increased speed of response since the increased speed was as apparent on the first trial as on any later trials. Under the competitive condition, the level of palmar skin conductance increased and self-rated alertness increased, but these measures were not related to the decrease in reaction time. Thus the speed of performance and some measures of the level of motivation both increased in a competitive situation, but there was no evidence in these experiments for a causal relationship between them.

124. Clemens, T. L., & Selesnick, S. T. Psychological method for evaluating medication by repeated exposure to a stressor film. Diseases of the Nervous System, 1967, 28, 98-104.

In a double-blind study, 36 Ss with mild to severe anxiety were shown a stressor film of 100 min. on 2 occasions, 1 week apart. After the 1st viewing 8 Ss received 20 mg. of diazepam, and 8 Ss placebo. No significant differences in the physiological or psychiatric measurements between the 2 groups were observed before medication. After medication all autonomic nervous system (ANS) measurements favored the diazepam group and were statistically significant in skin conductance, respiration, and composite scores of ANS functions. Ss with less anxiety and more effective ego functioning showed greater ANS adaptation to a 2nd viewing of the film, regardless of the medication. These differences were not mutually consistent, nor of the magnitude demonstrated by the ANS reactivity measurements. It is concluded that diazepam is an effective agent for reducing the somatic aspects of anxiety, and that the methods in this study are sufficiently sensitive to evaluate the effects of many therapeutic agents in a variety of psychological and physical disorders.

125. Cofer, C. N. The psychogalvanic response as an indicator of emotional reaction to personality test items. American Psychologist, 1948, 3, 303. (Abstract)

The Tarchanoff effect was measured for each S while he responded to a series of items from the Minnesota Multiphasic Personality Inventory (individual form). At a second session, each S was interviewed concerning his responses to certain of the items. To some of these items he had given large psychogalvanic responses; to others, little galvanic response was given. By such a procedure, "emotional involvement" on the test items can be gauged objectively and more meaningfully than would be possible without an external criterion.

126. Cofer, C. N., Judson, A. J., & Weick, D. V. On the significance of the psychogalvanic response as an indicator of reaction to personality test items. Journal of Psychology, 1949, 27, 347-354.

Malingering on paper and pencil personality tests is an important obstacle to their significant employment as screening devices in military settings. Physiological methods might be used to detect such malingering. Psychogalvanic response, Tarchanoff effect, was used in this study to test 25 male sophomore S's while taking the Minnesota Multiphasic Personality Inventory. Later interview was held to discuss some of the items on which the subject had shown large deflections. Neither statistics nor analysis of statements gave significant diagnoses, although in individual cases material of personal significance did appear. Deviation was not always significant of past emotional associations; hence the authors conclude that PGR would not be of much validity in detecting malingering.

127. Cohen, J., & Walter, W. G. The interaction of responses in the brain to semantic stimuli. Psychophysiology, 1966, 2, 187-196.

Long time-constant EEG recording during paired stimuli has led to the discovery of the contingent negative variation or expectancy wave (Walter, 1964). This effect is produced when a conditional stimulus signals that an imperative stimulus demanding action, decision, or attention will follow at a short, constant time interval.

Symbolic and meaningful stimuli were presented to subjects tachistoscopically and the evoked responses in the brain were electronically averaged. The cerebral evoked responses to such psychological stimuli are more complex than to flashes. A slow negative DC potential shift (CNV) was seen during the interval between an auditory ready signal and visual exposure if recognition of the stimulus was required, or if it was interesting. Following the visual exposure, a slow positive DC shift occurred. The method has been developed to study the brain responses to psychological stimuli. The amplitude of the responses relates to the information content and subjective factors rather than to the physical strength of the stimulus.

128. Cohen, S. I., Bondurant, S., & Silverman, A. J. Psychophysiological influences on peripheral venous tone. Psychosomatic Medicine, 1960, 22, 106-117.

Ten volunteer subjects were exposed to a series of words and phrases while they were resting in an isolated sound-attenuated area. The verbal stimuli presented were bland or neutral expressions and charged words or expressions. In addition to periods in which words were presented, 4 silent periods were introduced in which all experimental procedures were carried out.

Pulse rate, skin resistance and EEG were carried out to evaluate changes in the level of arousal of the subjects.

The skin resistance decreases specifically associated with the presentation of words was significantly greater after charged than neutral expressions. Pre-and poststimulus skin resistance records indicated a more intense level of arousal in the poststimulus periods following charged words, an equivalent level after bland words, and decreased level of arousal after silent periods.

The reactions of individual subjects were not merely a function of the type of stimulus but were closely related to the personal meaning the stimulus had for each subject.

Venous pressure changes probably are due to sympathetic impulses which cause an increase in venoconstriction. Emotionally arousing stimuli are able to produce changes in venous tone. This change probably is due to the central nervous system arousal caused by the provoking psychologic stimuli. The increased levels of arousal, in turn, lead to an increase in sympathetic nervous system excitation.

129. Cohen, S. I., Silverman, A. J., & Burch, N. R. A technique for the assessment of affect change. Journal of Nervous and Mental Disease, 1956, 124, 352-360.

The use of more sensitive instruments and the application of the arousal scale, as a frame of reference, permit the use of the GSR as an indicator of changes in affect level.

Changes in the arousal level are reflected in the relationship of the amplitude of the subjects' GSR responses to specific, externally applied stimuli and the frequency of spontaneous, non-specific responses.

Subjects' responses to a group of words were compared before and after several of the words had been focused on during an interview where attempts were made to increase or decrease the affect associated with them. The results indicated that the general level of anxiety was lowered and less diffuse. However, specific responses to a limited number of words increased, and the GSR responses appeared to vary directly with the affective responses of the subject. The possible uses of this instrument in research and clinical psychiatry are discussed.

130. Cohen, S. I., Silverman, A. J., & Zuidema, G. Physiologic stress response evaluation by focused interviewing. A.M.A. Archives of Neurology and Psychiatry, 1956, 76, 670-674.

Preliminary studies on a small group of subjects suggest that focused-interview techniques, directed at evaluating the affective constellations of the subjects, is a promising method of judging cardiovascular responses to a physiologic stresser. The conceptual framework involved the integration of specific affect states, i.e., anger or anxiety, adrenaline-arterenol ratios, and related blood pressure patterns.

131. Cohn, R. The influence of emotion on the human electroencephalogram. The Journal of Nervous and Mental Disease, 1946, 104, 351-357.

"Hyperemotional states give rise to two characteristic types of electroencephalographic pattern. Type I is characterized by a 'spontaneous' low voltage random high frequency pattern. When the attention of the patient is removed from the test and his environment, a normal brain wave pattern ensues. The Type II pattern is characterized by rhythmic, approximately 20 per second activity predominantly in the frontal and parietal regions. This pattern is stable and uninfluenced by afferent stimuli of ordinary intensity...The rhythmic high frequency potentials observed in hyperaffective disorders is a product primarily of frontal lobe activity....Physiologically increased frontal lobe activity, as evidenced by the superimposition of somatic complaints on a basic emotional disorder, results in an enhanced frontal electric potential output. Hence, the rhythmic high frequency oscillations of the frontal regions may be considered as 'true' action potentials."

132. Colgan, D. M. Effects of instructions on the skin resistance response. Journal of Experimental Psychology, 1970, 86, 108-112.

Effects of instructions on component responses of the skin resistance response were examined. Two groups of Ss were each given 30 presentations of signal lights, with shock following on 50% of trials after an interstimulus interval (ISI) of 6 sec. On the fifteenth trial, one group was told how to predict shock, and the other was given dummy instructions. Results were that: (a) responses occurring in the ISI, and those occurring after the point of shock onset, declined in magnitude for predictable nonshocked trials; (b) in disagreement with previous evidence, responses to shocked trials remained constant after shocks became predictable; and (c) contrary to previous evidence, interruption effects of instructions did not diminish postshockpoint responses. Data suggest that component responses of the skin resistance response reflect simple changes in arousal mechanism activity.

133. Collins, B. E., Ellsworth, P. C., & Helmreich, R. L. Correlations between pupil size and the semantic differential: An experimental paradigm and pilot study. Psychonomic Science, 1967, 9, 627-628.

Both changes in pupil size and ratings on the three dimensions of the semantic differential were obtained in response to 36 stimuli. Correlations were computed across stimuli for each subject. These within-subject correlations between changes in pupil size and the scales of the semantic differential indicated a positive relationship between pupil size and the "potency" scale (strong-weak; large-small; heavy-light) of the semantic differential. Contrary to an extrapolation of Hess' discussions, there is no evidence that pupil size is positively related to the evaluative (good-bad) dimension of meaning. No results were obtained for verbal, attitude-statement stimuli.

134. Cook, J. J. Additional variables in autonomic measurement. Psychophysiological Newsletter, 1963, 9, 14-22.

Finger temperature, skin resistance and heart rate measures were obtained while 12 female sophomores were instructed to focus on important feelings and to count randomly flashing lights. In the framework of an orthogonally partitioned Latin Square, these instructions were counterbalanced with subject position (sitting or lying) and experimenter's location when giving instructions (in and out of the room). The results showed that:

1. When compared to counting flashing lights, focusing on important personal feeling was accompanied by a state of reduced arousal indexed by greater temperature increment, steeper slope in skin resistance, lower GSR rate and greater range in both skin resistance and heart rate.
2. In spite of being the condition of least arousal, focusing on feelings was experienced as the more difficult instruction to carry out.
3. The supine as opposed to the sitting position was characterized by a decrease in finger temperature and a decrease in heart rate range.

While some speculation entered into the discussion, it does seem safe to say that in physiological experiments the variables, subject position and the internal-external attention state of the subject should be controlled.

135. Cook, S. W. Studies of attitude and attitude measurement. Final Technical Report, March 1, 1968, University of Colorado, AD 666 455, AF Grant No. 436-66.

The goal of the project is to make a systematic and comprehensive study of the effect of an attitude upon a variety of responses. Depending upon the outcome of this work, certain responses will be chosen as indicators of attitude. These responses will be utilized as bases for the construction of attitude measures.

The responses being studied and the measures being developed are classified in terms of the nature of the evidence they provide and the nature of inferences drawn from response to attitude direction and strength. Eight categories of potential measures are being explored:

- i. Overt behavior toward the attitudinal object.
2. Interpretation of and reactions to incomplete or ambiguous stimuli.
3. Adequacy of task performance.
4. Judgements of attitudinally relevant materials and persons.
5. Choice of classificatory principles.
6. Perceptual responses.
7. Involuntary physiological responses.
8. Verbal self-reports.

136. Cook, S. W. & Harris, R. E. The verbal conditioning of the galvanic skin reflex. Journal of Experimental Psychology, 1937, 21, 202-210.

"This study has attempted a verification of the following hypothesis; the conditioning of the galvanic skin response in the human adult differs from the customary conditioning procedure in that, under the conditions of this experiment, (a) this response is established by means of a process of verbal conditioning, and (b) it is therefore not established as a result of a series of paired inadequate-adequate stimuli combinations. The experimental findings confirming this hypothesis are as follows: (1) A conditioned galvanic response was obtained by merely instructing the subject that electric shock (adequate stimulus) would follow a green light (inadequate stimulus). (2) The actual presentation of a series of inadequate-adequate stimuli combinations did not increase the strength of the conditioned response beyond its strength following the verbal association made during the instruction. (3) No consistent difference in strength of conditioned response was found after conditioning series of 1, 15, and 30 trials. (4) Despite a conditioning series of 30 light-shock combinations, either a marked weakening or complete elimination of the conditioned response resulted from instructing the subject that the shock would no longer follow the light."

137. Cook, S. W., & Selltitz, C. A multiple-indicator approach to attitude measurement. Psychological Bulletin, 1964, 62, 36-55.

Most experimental research on attitudes has used crude measuring instruments, relying on aspects of research design and analysis to overcome ambiguities of interpretation permitted by the measuring instrument. As a step toward more efficient selection of measuring instruments, this paper examines different types of instruments from the point of view of the kinds of evidence they provide as a basis for assessing attitudes and of the nature of the inferences involved. Five classes of techniques are discussed--measures in which the material from which attitudes are inferred consists of: self-reports of beliefs, feelings, behavior, etc., toward an object or class of objects; observed overt behavior toward the object; reactions to or interpretation of partially structured material relevant to the object; performance on "objective" tasks where functioning may be influenced by disposition toward the object; and physiological reactions to the object.

138. Cooper, J. B. Emotion in prejudice. Science, 1959, 130, 314-318.

The validity of the thesis that prejudicial attitudes are supported by relatively high levels of emotionality was tested in 3 studies. Major sections are: "Responses to Verbal Contradiction of Positive and Negative Attitudes," "Responses to Verbal Contradictions of Negative Attitudes--Partial Replication" "Attitudes Predicted from Skin Response Measurements--Reverse Design". Galvanic skin response was used as an index of emotion. The fundamental hypothesis was confirmed in several separate analyses of data.

139. Cooper, J. B. Emotion and prejudice. In physiological measurement in social psychological research. Symposium presented at the American Psychological Association, San Francisco, 1964.

In discussing the feasibility of the use of physiological measurement for the assessment of attitudes, Cook and Selltitz have recently emphasized the need for "...extreme caution in drawing inferences about the attitude of a given individual from a measure of this type." It has been suggested by some that physiological measurement--GSR, for instance--might someday be used as the perfect attitude measure. While this is an intriguing speculation, I would agree with Cook and Selltitz, that it seems highly improbable, since there are attendant cognitive, affective-direction, and situational variables which elude this type measurement. That is, attitude measurement, in the full sense, is more than lie detection. On the other hand, as Cook and Selltitz emphasize, physiological measurements "...point to encouraging possibilities for empirical research and to the opportunity to greatly increase our understanding of attitudes..." It is this, the increase in our understanding of the attitude process which prompts the type of work we have been trying to do.

140. Cooper J. B. Emotional response to statements congruent with prejudicial attitudes. The Journal of Social Psychology, 1969, 79, 189-193.

In our studies thus far, then, two findings of significance seem to have emerged. First, when the object of a negative prejudicial attitude is exposed to a verbal statement which strongly compliments that object, the subject reacts with relatively great emotionality. Second, also when the object of a positive prejudicial attitude is exposed to a verbal statement which strongly compliments that object the subject reacts with relatively great emotionality. It is suggested here, as before, that from a psychodynamic standpoint strong negative and positive prejudicial attitudes do not seem to be equally opposite.

141. Cooper, J. B., & Pollack, D. The identification of prejudicial attitudes by the galvanic skin response. Journal of Social Psychology, 1959, 50, 241-245.

This study was the third in a series designed to test the prevalently held view that when prejudicial-attitudes are brought into play they are affectively supported. The first two studies provided evidence in support of this view. These studies showed a consistent relationship between prejudicial-attitude strength and affectivity level. Subjects used in these first two studies were only those who had already indicated relatively strong prejudicial-attitudes toward particular social groups by way of rating and ranking scale performance.

The present study, the third, was designed as a "check" on the first two, and differed from them in two principal ways. First, the sample was random, in the sense that information with reference to subjects' prejudicial-attitudes had nothing to do with their selection. Second, GSRs were recorded first and paired-comparison scales were administered later. In the latter respect, the third study was a reversal of the procedure used in the first two.

It was predicted that relatively great affectivity (as measured by relatively great GSR) would be indicative of relatively great antipathetic prejudicial-attitude (as measured by a relatively low position on the paired-comparison scale).

The results of this study confirm those of two previous studies which demonstrated a relationship between prejudicial-attitude content and strength, and level of affectivity. The effect of these findings lends additional support to the contention that prejudicial-attitudes are affectively supported.

142. Cooper, J. B., & Siegel, H. E. The galvanic skin response as a measure of emotion in prejudice. Journal of Psychology, 1956, 42, 149-155.

The hypothesis was advanced that galvanic skin responses will be greater when strong negative (prejudicial) attitudes are held in a complimentary light than when neutral (non-prejudicial) attitudes are held in a complimentary light. Twenty-three of 176 subjects who had completed a 20-group ethnic and national rating and ranking attitude scale were called in for individual study; these were subjects who had expressed antipathy to particular ethnic and national groups both by ratings and rankings. In individual sessions GSRs to statements read to them about the groups they had rated and ranked were obtained. Twenty of the 23 subjects had greater GSRs to the statements which contained stimulus words toward which they had already indicated strong negative attitudes. Support for the hypothesis was offered by the finding that the probability for such a difference could occur by chance only once in two thousand occurrences (CR of 3.333).

143. Cooper J. B., & Singer, D. N. The role of emotion in prejudice. Journal of Social Psychology, 1956, 44, 241-247.

Simple rating and ranking scales were used to screen subjects who indicated prejudices (strong positive and negative attitudes) toward certain groups. Those so screened were tested individually for the degree of emotionality which accompanied the use of strong negative, strong positive, and middle-area attitudes. Level of emotionality was described as the psychogalvanometric reading multiplied by duration.

The two hypotheses examined resulted in the following findings. When levels of emotion which accompanied the use of strong negative attitudes were compared with levels which accompanied the use of middle-area attitudes, the former were overwhelmingly in excess. Consistently, but less dramatically, the same was found for strong positive attitudes.

144. Coppock, H. W. Responses of subjects to their own galvanic skin responses. Journal of Abnormal & Social Psychology, 1955, 50, 25-28.

Hypotheses I and IV, that suggestion would lower skin resistance and impair performance, were supported by significant changes in the expectant fathers group. Hypothesis III, that suggestion would increase response to the artificial GSR, was not supported, although there was a significant increase in group variability of these responses. Hypothesis II, that the resistance of each S would become more variable, was not supported at the level of statistical significance.

It is concluded that data have been obtained which are not inconsistent with the hypothesis that suggestion and stress can influence the extent of an individual's overreaction to information about his own autonomic responses. More specific identification of the crucial independent variables awaits improvements of procedure such as by mechanical standardization of the suggestions or by utilizing conditioning instead of suggestion.

145. Corteen, R. Skin conductance changes and word recall. British Journal of Psychology, 1969, 60, 81-84.

An experiment was carried out to test the hypothesis that size of phasic conductance response to an item is related positively to later recall of that item. Results confirmed the hypothesis with the additional finding that the positive relation increases with increasing delay in recall. Some attempt is made to explain the findings in terms of a simple memory process.

146. Costell, R. M., & Leiderman, P. H. Psychophysiological concomitants of social stress: The effects of conformity pressure. Psychosomatic Medicine, 1968, 30, 298-310.

Skin potential concomitants of social conformity and independence were studied in a modified Asch situation utilizing naive subjects in both minority and majority roles. Behavioral and skin potential data for both roles demonstrated increase autonomic arousal for minority subjects remaining independent during conformity pressure. Minority subjects yielding to conformity pressure had lower levels of arousal, similar to the habituation pattern of control subjects. Majority-role subjects confronting independent minority-role subjects exhibited increased habituation of skin potential when contrasted with majority role subjects facing yielding minority-role subjects.

147. Courter, R. J., Wattenmaker, R. A., & Ax, A. F. Physiological concomitants of psychological differentiation. Psychophysiology, 1965, 1, 282-290.

Thirty-two male college students who scored above 50 (standard score) on the Closure Flexibility (CF) test were designated field independent (FI), and eight who scored below 50 were designated field dependent (FD). It was found that FI subjects were able to discriminate between the conditioned tone (CS) and the unreinforced generalization tones by the amplitude of their GSR significantly better ($p < 0.01$) than were FD persons. Although it cannot be asserted with certainty that this relationship is dependent on the autonomic response system, there is tentative support for this position. It seems probable that even the FD subjects could distinguish between the two most different pitched tones; yet they failed to make this distinction by their GSR responses. This lack of differentiation by the FD subject appears to be a function of a less well-differentiated autonomic nervous system. This study demonstrates that the stimulus generalization gradient involves an interaction between the cognitive style of the organism and the impinging stimuli, not merely the quantitative physical characteristics of the stimuli.

148. Coverdale, H. L., & Leavitt, C. Pupil size as a predictor of coupon return performance: A directional trend approach. Proceedings of the 76th Annual Convention of the American Psychological Association, 1963, 3, 673-674.

The results of the present study suggest that information concerning the pattern of pupillary response across pages of an ad may be an important variable in determining the contribution of each page to the overall performance of an ad. The practical usefulness of the pupillary response in advertising has been demonstrated; however, an investigation of the mediational processes involved should be investigated in future research.

149. Cowen, M. A. The baseline transephalic DC potential in normals. Journal of Psychiatric Research, 1965, 5, 307-315.

This study, employing six groups of non-psychotic, unmedicated male subjects, ranging from six to sixty in number in each group, replicates and expands on previous work concerning the effects of a number of variables on the initial baseline transephalic d.c. potential (IP) and the baseline d.c. shift (ΔP) after a 10-minute test period involving the subjects in performing mental tasks. In agreement with prior studies, the range of IP was found to be from -25.0 to +30.0 mV and appears to be unaffected by age or intelligence. Anxiety increases the variance of the group tested. Subjects tend to be most negative around 3:00 p.m. to 5:00 p.m. and 2-3 hr. after eating. Heavy eaters show a decreased ΔP in response to novel stimuli, (novelty was manipulated by changing subject's set) faecal retainers show a more positive IP and a more negative ΔP , and mild urinary retention increases the variance of the IP. Subjects with an allergic history show a general increase of both negative IP and ΔP . A 20-minute waiting period abolishes any effect of nicotine inhalation. The greatest stimulus to promote a ΔP is one requiring the subjects to develop a new and complex orientation in order to respond to a task.

150. Cowen, M. A. Elementary functional correlates of the transephalic DC circuit. Psychophysiology, 1967, 3, 262-272.

A brief general theory is proposed linking the transephalic DC potential, which is recorded on the midline surface of the head over the frontal and occipital emissary veins, with a certain functional organization of the brain. From this it is proposed that interoceptive or protopathic afferents--carotid sinus, carotid body, vestibular, and visceral--should produce a positive frontal deflection, while exteroceptive or epicritic afferents--tactile, auditory, proprioceptive, gustatory, visual, and olfactory--should produce a negative frontal DC shift. It is proposed that hunger promotes a negative frontal base line, satiety a positive one, and anxiety increases the base-line variance of a group. A relationship is proposed between frontal negativity and body metabolic peaks. It is proposed that a noxious exteroceptive stimulus produces a positive frontal shift, despite its cortical projection. The hypotheses were tested using normal adult male Ss and good agreement between results and predictions was found.

151. Cowen, M. A. Some higher functional correlates of the transephalic DC circuit. Psychiatric Quarterly, 1968, 42, 409-429.

The purpose of this paper is to describe a series of studies in which pertinent (reality testing) sets were independently measured and the results correlated with certain TCDC potential parameters; with certain physiological states which are known to influence the TCDC circuit; and finally with certain non-linearities in the transient TCDC potential responses to certain stimuli.

The first index of a reality testing set used was the subject's basic personality structure as indicated by the presence or nature of a psychiatric diagnosis. Secondly, since many theorists hold that the subject's own body serves as the initial object in reality testing, two tests of body orientation were employed, the Barrier Score and the Body Focus Questionnaire (BFQ). Finally, a simple test was developed in which the subject rated a series of pictures in terms of certain attributes, thereby providing an objective, numerical sample of how he structured his view of the world with respect to these attributes.

152. Craig, K. D. Psychological arousal as a function of imagined, vicarious, and direct stress experiences. Journal of Abnormal Psychology, 1968, 73, 513-520.

The study examined the extent to which skin conductance (SC), heart rate (HR), and respiration rate (RR) indexes indicated similarities and differences among arousal patterns to direct aversive stimulation, observing another experiencing the situation, and imagining oneself in the situation. Holding one's hand in 2 degree C. water provided the aversive situation. Thirty-six male and 36 female unselected undergraduates underwent the 3 experiences in balanced orders. The results indicated that the direct experience was the most arousing, but the imaginative and vicarious experiences could not be clearly distinguished from one another when the magnitude of change was considered. Qualitative differentiation appeared in HR changes with the direct and imagined experiences producing HR acceleration and the vicarious experience producing deceleration. The implications of the findings for desensitization procedures and social learning theory were discussed.

153. Craig, K. D., & Crockett, D. J. Physiological correlates of inflicting pain upon others. Proceedings, 76th Annual Convention of the American Psychological Association, 1968, 3, 389-390.

The present study examined skin conductance correlates of the act of administering shock to another person up to the stage at which S wished to discontinue. Two groups differing in the degree of responsibility for inflicting pain upon the recipient of the shock were contrasted with each other and with a control group administering nonincremental shocks. One group had control of the decision as to whether shocks would be administered, whereas the other groups estimated whether the recipient could tolerate additional shocks. The Ss in all groups pressed the key that ostensibly administered the shock.

154. Craig, K. D., & Lowery, H. J. Heart-rate components of conditioned vicarious autonomic responses. Journal of Personality and Social Psychology, 1969, 4, 381-387.

The present study examined heart-rate and skin resistance responses within a paradigm for the classical conditioning of vicariously instigated autonomic responses using electric shock to a model as the unconditioned stimulus (UCS). Fifty-six undergraduate observers were assigned to one of four groups in which subjects either (a) anticipated going through the model's task, (b) were assured that such would not be the case, (c) simply observed the model move, rather than be shocked, or (d) did not see the model move or be conditioned. Observing the model being shocked or simply moving produced heart-rate deceleration of varying degrees of magnitude. The implications of the finding for models of vicarious learning and emotional sensitivity to others are discussed.

155. Craig, K. D., & Weinstein, M. S. Conditioning vicarious affective arousal. Psychological Reports, 1965, 17, 955-953.

GSR reactivity, serving as a physiological measure of affective arousal, was instigated and conditioned when Ss observed a performer consistently failing at a motor task. Experimental groups who were told that shock was contingent upon the performer's failure manifested no more vicarious affective reactions than groups observing failure only. Groups observing failure consistently responded with more GSRs than groups observing task success.

156. Craig, K. D., & Wood, K. Physiological differentiation of direct and vicarious affective arousal. Canadian Journal of Behavioral Science, 1969, 1, 98-105.

The study examined the extent to which skin conductance and heart rate indices differentiated between responses to direct adverse stimulation and responses while observing another experiencing the adverse stimulation. Tolerating immersion of the hand in a -4°C brine solution was the adverse stimulation. Forty-eight male and female unselected undergraduates underwent the two experiences. Differential patterns of autonomic response appeared. Both experiences produced increases in skin conductance. The direct experience produced acceleration of heart rate, whereas the vicarious experience tended to produce deceleration of heart rate. The sequence of the experiences and the degree of stress inherent in the situation were related to the heart rate.

157. Cronkhite, G. L. Autonomic correlates of attitude change. (Doctoral dissertation, University of Iowa) Ann Arbor, Michigan: University Microfilms, 1965. No. 65-11, 607.

An independent measure of "dissonance-produced arousal" is prerequisite to a direct test of dissonance theory. The experimenter proposed heart rate as that measure. An experiment was designed in which 49 subjects completed tests of their attitudes toward "John Glenn" and "Admission of Communist China to the U. N." and a test of the importance they attached to the question of admission. The 26 subjects who were initially favorable toward Glenn and unfavorable toward United Nations membership for Communist China were "dissonant," while the 23 subjects who were initially favorable toward both Glenn and the concept were "consonant."

Among the 26 "dissonant" subjects only, the difference between a subject's attitude toward Glenn and his attitude toward the concept was the measure of degree of "dissonance."

Additional analyses revealed that: (1) heart rate change from the control period to the listening period was significantly lower for "dissonant" than for "consonant" subjects; (2) initial attitudes of "consonant" subjects toward both source and concept were positively correlated with heart rate lability during rest; and (3) favorable attitude change toward the source among "consonant" subjects was negatively correlated with heart rate lability during rest.

158. Cronkhite, G. Autonomic correlates of dissonance and attitude change. Speech Monographs, 1966, 33, 392-399.

Leon Festinger's theory that discrepant cognitions create tensions, called cognitive dissonance, which the individual strives to reduce by making his cognitions more consistent, is tested. Subject's dissonance was defined as the magnitude of the difference between a subject's attitude toward a concept and his attitude toward its source, as measured by ten semantic-differential type scales. Heart rate and skin conductance measured autonomic arousal. Results show that while Festinger may have been correct in predicting that what he called "dissonant" situations would produce what he called "dissonance-reducing behavior," his theory that a "dissonance-produced drive" intervenes is not supported by the data of this experiment.

159. Curtis, G. C., Fogel, M. L., McEvoy, D., & Zarate, C. The effect of sustained affect on the diurnal rhythm of adrenal cortical activity. Psychosomatic Medicine, 1966, 28, 696-713.

Interactions between sex, affect intensity, and the circadian rhythm were found to be related to urinary excretion, but not plasma concentrations of 17-OHCS. Men excreted more 17-OHCS than women, but the sex difference was concentrated mainly in the morning hours near the peak of the diurnal curve. The increment in 17-OHCS excretion associated with sustained affective distress in men was also concentrated mainly at the peak of the curve. In women, the increment in urinary 17-OHCS associated with affective distress was concentrated in the "trough" of the curve, during the afternoon and evening hours. It is suggested that the failure of plasma concentration to reflect these differences could have resulted from the action of a closed loop controller, coupled with differences in cortisol disposal rates similar to those suggested by other workers.

Affective distress was also associated with increased between-subject differences in diurnal trend similar to, but less marked than, those observed by other workers in patients with brain damage.

160. Curtis, G., Fogel, M., McEvoy, D., & Zarate, C. Urine and plasma corticosteroids, psychological tests, and effectiveness of psychological defenses. Journal of Psychiatric Research, 1970, 7, 237-247.

Previous reports of the lack of a significant correlation between urinary and plasma 17-OHCS were confirmed. Hence the 2 variables cannot be held to provide similar information in such subjects. The significant psychological correlates of urinary 17-OHCS were more numerous and more consistent across sexes than the correlates of plasma 17-OHCS. The best psychological predictors of urinary 17-OHCS were scores on the Taylor Anxiety Scale (positively related), the Leary Hostility Scale (positively related), and the Nowlis Social Affection Scale (negatively related).

The previously reported inverse relationship between urinary 17-OHCS and 'Effectiveness of Psychological Defenses' was confirmed in women, not in men. No relationship was found between Effectiveness of Defense and plasma 17-OHCS. The concept, Effectiveness of Defenses as used here referred to overall operation of character defenses rather than to defenses against a specific external challenge, as was true in other studies. Pending further refinements of concept and technique, only cautious generalizations should be made from defenses against an external challenge to defenses in general.

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161. Damaser, E. C., Shor, R. E., & Orne, M. T. Physiological effects during hypnotically requested emotions. Psychosomatic Medicine, 1963, 25, 334-343.

It was demonstrated that consistent physiological changes occur in response to hypnotically requested emotions, but that similar changes occur just as readily during waking control conditions, and can be produced just as clearly by Ss simulating hypnosis. The findings place the burden of proof upon anyone who wishes to assert an extravoluntary nature for such physiological effects.

162. Darrow, C. W. Differences in the physiological reactions to sensory and ideational stimuli. Psychological Bulletin, 1929, 26, 185-201.

This review supports the generalizations offered at the beginning, in that numerous investigators are shown to have found:

1. That the immediate reflex response to momentary sensory excitation differs from the response mediated by associative processes, or ideas, aroused by the stimulus, and that both of these reactions have been termed "emotion."
2. That momentary sensory stimuli are relatively more effective than ideas in exciting peripheral changes such as vasoconstriction, perspiration and the galvanic skin-reflex, while associative processes or ideas are more effective in increasing cardiac activity as indicated by pulse rate or blood pressure.
3. That the exceptions to these principles are: (a) the fact that disturbing ideas occasioning extreme unpleasantness or depression may slow the heart rate. (b) the fact that tastes and smells, though sensory stimuli, as a rule occasion increased rather than decreased pulse rate (except where irritation of the trigeminal nerve is involved). (c) the fact that continuous prolongation of sensory stimuli is likely to be accompanied by increased heart rate. (d) the fact that fright or extreme startledness following sensory stimuli is likely to be accompanied by a momentary increase in pulse rate preceding the characteristic slowing.

163. Darrow, C. W. Electrical and circulatory responses to brief sensory and ideational stimuli. Journal of Experimental Psychology, 1929, 12, 267-300.

The results of this study may be summarized in the following statements.

1. Blood pressure and the galvanic skin-reflex may vary independently.
 2. There is a general tendency for sensory stimuli to occasion larger galvanic and smaller blood pressure changes than disturbing ideational stimuli and, conversely, for disturbing ideational stimuli to occasion larger blood pressure rise and smaller galvanic changes than sensory stimuli.
 3. There is a general tendency for disturbing ideational stimuli to occasion larger blood pressure and galvanic changes than indifferent ideational stimuli, and for this difference, as measured by percentage of the total change or as compared with the P. E. of the difference, to be greater for the former than for the latter measure.
 4. Respiratory reactions tend to be different following the various stimuli and to be of such a character that they may contribute to differences in blood pressure.
 5. Cardiac activity as indicated by pulse rate is increased more consistently by ideational than by sensory stimuli.
 6. Cardiac activity as shown by the method of correlation is probably a consistent factor in the increased blood pressure occasioned by ideational stimuli but not in that caused by sensory stimuli.
 7. Vasoconstriction as indicated by decreased peripheral volume is more marked following sensory than after ideational stimuli.
164. Darrow, C. W. Emotion as relative functional decortication: The role of conflict. Psychological Review, 1935, 42, 566-578.

Blood pressure has been found to be the most sensitive of the physiological changes to disturbing ideas, and hence to cortical activity, even though the immediate mechanism of emotion is subcortical and that of the cortex is to differentiate stimulus patterns and exert an inhibiting influence on subcortical regions. The explanation offered is that when conflicting perceptual and ideational excitations of the cortex occur, the resulting conflict interferes with the inhibitory function of the cortex and thereby releases the subcortical emotional patterns. It is emphasized that the theory applies only to "dynamic" conflict, and that further research is necessary to determine whether repressed conflict plays a similar role.

165. Darrow, C. W. The equation of the galvanic skin reflex curve: I. The dynamics of reaction in relation to excitation-background. Journal of General Psychology, 1937, 16, 285-309.

In order to provide a basis for determining the psychological correlates of various components of the galvanic skin reflex curve, an attempt has been made to analyze it on dynamic principles into its essential determiners or parameters. Several, though possibly not all, important aspects of the curve have been identified and means for their measurement have been suggested. An equation relating these components has been derived. A tentative consideration of the possible significance of the various components of the curve has been offered on the basis of available related evidence. Final interpretation must await actual application of the analysis to extensive data. The method appears especially applicable to the study of aspects of neurophysiological organization and function which are disturbed in psychopathological conditions. The relation between subject attitude (orientation) and GSR is also briefly discussed.

166. Darrow, C. W. Psychological and psychophysiological significance of the electroencephalogram. Psychological Review, 1947, 54, 137-168.

A section of this report relates EEG changes to emotional and attitudinal behavior.

167. Darrow, C. W. A new frontier: Neurophysiological effects of emotion on the brain. In M. L. Reymert (Ed.), Feelings and emotions. New York: McGraw-Hill, 1950. Pp. 247-260.

Reviews studies relating EEG to emotion in general. The report also has a minor section dealing with the relation of EEG and autonomic changes to "ideational stimuli" and events of special significance to the subjects.

168. Darrow, C. W., & Gullickson, G. R. The CNV and phasic cortical effects of expectancy and conation. Federal Proceedings American Society of Experimental Biology, 1967, 26, 373. (Abstract)

Both the Mnemotron computer (CAT) averages of "contingent negative variation" (CNV) and the computer compilations of momentary cortical interarea phase changes during expectant and conative experimental conditions demonstrate cortical precursors of response: Both typically occur during the period of "expectancy" or preparation for action preceding a signal for a required response.

169. Darrow, C. W., & Gullickson, G. R. Phase reversal of EEG during attentive, associative and reactive conditions. Electroencephalography and Clinical Neurophysiology, 1967, 23, 92. (Abstract)

Attention-getting and disturbing semantic stimuli which involve cortical perceptual activity and which elicit the galvanic skin response, may also occasion EEG phase reversal during the latent period of the GSR, and primarily central leading without reversals during the subsequent peripheral electrical, sympathetically mediated sweat changes.

170. Darrow, C. W., & Hicks, R. G. Interarea electroencephalographic phase relationships following sensory and ideational stimuli. Psychophysiology, 1965, 1, 337-346.

Moment-by-moment changes in the phase or relative timing of electroencephalographic (EEG) patterns in different brain areas show great lability and psychological responsiveness, and are studied as possible correlates of peripheral psychophysiological reaction. Relative leading, lagging, and in-phase relationships between EEGs of different brain areas are automatically recorded, and stimuli classed as simple sensory, indifferent-ideational, disturbing-ideational, and adaption routines are employed. EEG leading in anterior and central brain areas is found to characterize conditions of arousal. Rapid diphasic reversals of inter-area EEG phase relationship during mental activity is possibly symptomatic of interaction between brain areas. Effects of familiarity and adaptation are evaluated.

171. Darrow, C. W., Pathman, J. H., & Morse, W. W. Significance of the electroencephalogram in ideation and emotion. American Psychologist, 1946, 1, 463. (Abstract)

Opposition between fast activity in the outer layers of the cortex and $10 \pm$ per second driving of that activity by thalamic (and hypothalamic) subcortical centers is paralleled by vasodilator vs. vasoconstrictor influence which regulates cerebral blood supply. Autonomic and electroencephalographic changes during ideation, emotion, overventilation, drugs, and change of posture become understandable when interpreted as psychophysiological regulations of cerebral function.

172. Darrow, C. W., Wilcott, R. C., Siegel, A., & Wilson, J. Central and peripheral indications of conditioning, adaptation, anticipation, and extinction. Journal of Nervous and Mental Disease, 1956, 124, 38-44.

Results from a new instrumental method of wave-by-wave phase and amplitude comparison of EEGs in different areas have been presented under conditions involving reaction anticipation, adaptation and conditioning. Results show a tendency for more anterior areas to lead more posterior areas during resting-waking conditions and for occipital leading to increase and anterior leading to decrease immediately following stimulation. Both phase and relative amplitude or "dominance" and spread of activity in different areas are involved. It is confirmed that changes in EEG other than "blocking" of alpha activity occur in reaction to stimulation, and in anticipation of expected stimuli.

173. Davidson, P. O. Validity of the guilty-knowledge technique: The effects of motivation. Journal of Applied Psychology, 1968, 52, 62-65.

Forty-eight Ss divided into 12 groups took part in an experimental investigation of detection of a simulated crime. For each of 12 crimes, 3 Ss were highly motivated to commit the crime; 1 succeeded, 1 attempted but failed, and 1 did not make an attempt. The 4th S interrogated for each crime was an innocent control. Motivation for deception (hope of reward) was high (\$25-\$50) for half of the crimes and low (<\$1) for the other half. Detection of deception using a polygraph recording of GSR and the guilty-knowledge technique resulted in correct classification of 92% of "guilty" Ss and 100% of "innocent" Ss. No significant differences were found due to level of motivation for deception. Results were discussed in terms of their relationship to similar studies and actual criminal investigations.

174. Davis, F. H., & Malmo, R. B. Electromyographic recording during interview. American Journal of Psychiatry, 1951, 107, 908-916.

1. A method for electromyographic study of the interview situation has been described.

2. In the present exploratory study, the close synchronization of physiological recording with sound-tape recording of interview content, which this method provides, has been of value in a number of ways: (a) in providing objective evidence, in Case 1, of the activation of a tensional headache mechanism by psychological stress; (b) in demonstrating the specificity of this mechanism, and its alteration following treatment; and (c) in providing objective evidence of physiological differentiation corresponding to differences in psychotherapeutic productivity in Case 2.

3. This method appears to be a promising one for use in further investigations of this kind.

175. Davis, R. C. Response patterns. Transactions New York Academy of Sciences, 1957, 19, 731-739.

A portion of this study details physiological response patterns induced by different pictorial material, e.g., a nude female and a starving man. Reactions of male and female subjects to the material was found to be different. The author points out: "This fact brings to light an important relation: an interaction between response measure, kind of subject, and the stimuli. This fact also shows that response patterns are no simple matter."

176. Davis, R. C. Physiological responses as means of evaluating information. In A. D. Biderman & H. Zimmer (Eds.), The manipulation of human behavior. New York, Wiley, 1961. Pp. 142-168.

In spite of the early scientific foundations of lie detection in the work of Benussi, Marston, Larson, and Summers there is at present a rather broad gap between current practice and scientific knowledge. There is, on the one hand, some information from the laboratory, which could be applied, and there are procedures of questioning, developed in field work, which await experimental testing. Although variation in procedure and in selection of cases makes present field data quite difficult to evaluate, it does seem probable that a significant amount of detection is being secured by physiologic methods. Laboratory experiments generally confirm the success of the technique.

177. Davis, R. C., & Buchwald, A. M. An exploration of somatic response patterns: Stimulus and sex differences. Journal of Comparative and Physiological Psychology, 1957, 50, 44-52.

In exploration of somatic response patterning (autonomic and skeletal muscle) changes were recorded from 12 males and 12 females as they were exposed to a series of lantern-slide pictures of widely different content in order to find whether the stimuli produced (a) responses, (b) different responses, (c) different patterns of response.

Twelve response variables were quantified and their changes plotted as functions of time after stimulus onset. Responses are evident in most variables and may be present in all, with differing time courses of rise and recovery.

A measure of response for each variable was chosen to include its maximum change. These measures were analyzed nonparametrically to discover consistency and interaction with respect to stimuli for the whole group of responses measures. Neither can be demonstrated by this method within the group of females, but both are present for males.

The sex difference seems to be one of response patterns also, with the males responding more in distal, and the females in axial regions. Our choice of measures favor the finding of greater total responses for males.

178. Dawson, M. E., & Reardon, P. Effects of facilitory and inhibitory sets on GSR conditioning and extinction. Journal of Experimental Psychology, 1969, 82, 462-466.

The effects of facilitory ("It is intelligent to become conditioned,") and inhibitory ("It is intelligent to not become conditioned,") set on the classical conditioning of the GSR of 80 college students were investigated. Both acquisition and extinction data revealed: (a) GSR magnitude of the facilitory group was significantly larger than that of the inhibitory group ($p < .05$); (b) GSR magnitude of the facilitory and inhibitory groups was significantly larger than that of a pseudoconditioning group ($p < .01$); and (c) GSR magnitude of neither the facilitory nor the inhibitory group differed significantly from that of a neutral instructions conditioning group. Differential UCR habituation was associated with the differential conditioning of the facilitory and inhibitory groups. These data suggest that previously reported significant results were due to the summation of facilitory and inhibitory set effects and not to their individual effects.

179. Day, M. E. An eye movement phenomenon relating to attention, thought and anxiety. Perceptual and Motor Skills, 1964, 19, 443-446.

An eye movement phenomenon, which is thought to be related to the shifting of attention and personal ways of handling anxiety, is described and discussed in relation to certain research hypotheses.

180. Dean, S. J., Martin, R. B., & Streiner, D. L. The use of sexually arousing slides as unconditioned stimuli for the GSR in a discrimination paradigm. Psychonomic Science, 1968, 13, 99-100.

Traditional studies of classical conditioning have relied heavily on the use of noxious stimuli. This study employed pin-up slides as non-noxious UCSs in a discrimination paradigm. Significant differential reactivity to critical and non critical stimuli was found for both CSs and UCSs. Differential novelty and meaningfulness as well as failure to find differences during the UCS interval on test trials raised the question of whether the obtained differences in reactivity were due to orienting or "conditioned" responses.

181. Deane, G. E. Human heart rate during experimentally induced anxiety. (Doctoral Dissertation, University of Connecticut) Ann Arbor, Michigan: University Microfilms, 1959. No. 59-3837.

When anxiety is induced experimentally by signals of shock-to-come, cardiac acceleration and cardiac deceleration both have been observed. This study was designed to discover some of the controlling conditions of these 2 cardiac effects.

Base level measurements of cardiac activity were made while Ss were watching the numbers 1 through 12 appear in the window of a memory drum. Then, each of the 36 male Ss was assigned at random to 1 of the 4 following conditions: (a) one-shock-at-number-10 condition--the Ss were told to expect a shock on number 10, and did receive it on the first trial; (b) no-shock-at-number-10 condition--the Ss were told to expect a shock on number 10, but never received it; (c) one-shock-at-unstated-number condition-- the Ss were told to expect a shock on some number and actually received one on number 10 during the first trial; (d) no-shock-at-unstated-number condition--the Ss were told to expect a shock on some number, but never received one.

In all groups there was an acceleration in heart rate over the base level on the first shock anticipation trial. In the 2 groups that actually received the shock on the first trial the acceleration had disappeared by the second trial and it remained absent during the following trials. In the 2 groups that never received the shock, the acceleration remained during the following trials.

Both groups that expected shock on number 10 also showed a deceleration in rate immediately prior to and during presentation of number 10. The no-shock-at-unstated number group which was not told to expect shock on number 10 did not exhibit this deceleration.

182. Deane, G. E. Human heart rate responses during experimentally induced anxiety. Journal of Experimental Psychology, 1961, 61, 489-493.

This study attempted to discover the controlling conditions of the 2 cardiac effects found during anxiety induced by signal of shock-to-come. Previous studies have shown both cardiac acceleration and cardiac deceleration in the interval between warning signal and shock. These 2 cardiac effects may be unlearned responses associated, respectively, with states of anxiety and fear.

183. Deane, G. E. Human heart rate responses during experimentally induced anxiety: A follow up with controlled respiration. Journal of Experimental Psychology, 1964, 67, 193-195.

One half of the Ss were allowed to breathe normally and ½ were required to breathe at a constant rate throughout. All Ss were then told to expect shock during No. 10 in a sequence of No. 1-12. One half of the Ss received one shock. All Ss showed an acceleration in heart rate during No. 1 through 8 and a deceleration during No. 10.

184. Deane, G. E. Human heart-rate responses during experimentally induced anxiety: Effects of instructions on acquisition. Journal of Experimental Psychology, 1966, 71, 772-773.

Base-level measurements of cardiac activity were made while 12 Ss watched the sequence of No. 1-12 appear on a memory drum. Each S was then told that he would sometimes receive a shock during 1 of the numbers. Each S received 10 shocks on No. 10 during the 15 shock-anticipation trials. An acceleration in rate during No. 1-8 appeared on the 1st trial and gradually decreased in amplitude over trials, whereas a deceleration in rate during No. 10 appeared only near the end of the trials.

185. Deane, G. E. Cardiac activity during experimentally induced anxiety. Psychophysiology, 1969, 6, 17-30.

Three studies are reported in which subjects (Ss) were instructed to watch a sequence of numbers appear on a memory drum and, after base-level determinations of cardiac and respiratory activity, were told to expect an aversive stimulus at a specific point in the number sequence. Subjects typically showed an acceleration in cardiac rate early in the number series and a deceleration just prior to and during the expected locus of shock. The acceleration was found to be greater for Ss told to expect strong shock than for those told to expect weak shock, greater for those receiving strong shock than those receiving weak shock, and under all conditions the acceleration decreased as a function of the number of shocks received. The deceleration, however, remained essentially constant across both trials and conditions and also occurred in groups told merely to expect a weak tone or a faint click. It appears that the acceleration may be a component of an anxiety response but the deceleration appears to occur under the present conditions in anticipation of any stimulation.

186. Deane, G. E., & Zeaman, D. Human heart rate during anxiety. Perceptual and Motor Skills, 1958, 8, 103-106.

Ten human adults were instructed that following a series of numbers presented visually, a shock would occur. During the number signals, the heart rate accelerated over a previously measure base level. After a single shock trial, the acceleration disappeared, being replaced late in the number series by a cardiac deceleration. Nine of ten records showed both effects. Several respiratory measures were found to be unrelated to the cardiac effects. Explanations of the change in form of the cardiac response were sought in terms of a change in anxiety level, and in terms of a possible distinction between anxiety and fear.

187. Dearman, H. B., & Smith, B. M. Unconscious motivation and the polygraph test. American Journal of Psychiatry, 1963, 119, 1017-1020.

The wrong identification of a bank employee as a "false positive" embezzler by polygraph tests is used as a point of departure for discussion "some of the psychological, ethical and possibly legal problems associated with the use of the polygraph examination (lie detector) in commercial establishments."

188. Defares, P. B., Van Enkevort, G. M., Van Gelderen, M. H., & Schendelaar, J. K. Pseudohartslagfeedback en angstreductie (Pseudoheartbeatfeedback and the reduction of anxiety.) Nederlands Tijdschrift voor de Psychologie en haar Grensgebieden, 1969, 24, 117-135.

Examined the effect fake extraneous stimuli-interpreted as real-has on anxiety reduction. Hypothesis I was that a person who experiences real anxiety will by a suggestion of a lowered heartbeat frequency experience a reduction in anxiety. Hypothesis II was a counterpart of I in that a suggestion of an increased heartbeat will increase anxiety. The fake stimuli consisted of false sounds of one's heartbeat. The experimental groups, in addition to the control, were: (1) the heartbeat-relaxation group, (2) the group that received the same sound as I but was led to believe that the sound was machine-derived, and (3) the group with a suggestion of an increased heartbeat. Anxiety was induced by the threat of a shock. Ss were 60 college students. In keeping with the law of initial value, the performances of the Ss were in terms of matched pairs. Heartbeat frequency was a more significant index of anxiety than scores on an anxiety scale. No significant correlations were found except that Hypothesis I was validated.

189. deLange, J. W., Van Leeuwen, W. S., & Werre, P. F. Correlations between psychological and electroencephalographic phenomena. Electroencephalography and Clinical Neurophysiology, 1960, 13, 393-401.

Thirty normal adults have been examined electroencephalographically and psychologically. The electroencephalograms have been analysed in various ways. The methods of analysis and presentation are described. According to the EEG data, the subjects are divided in different groups. The subjects belonging to some of these groups have psychological similarities. The relation of these findings with those of others is discussed as well as the possible significance for conditioning in humans.

190. Dicaprio, N. S., & Turnock, M. Persistence of GSR changes as a function of repeated verbal satiation of emotionally-charged words. Psychonomic Science, 1969, 17, 238-239.

The effects of repeated verbal-satiation applications, i.e., rapid repetitions of words for several minutes at a time, was studied over the course of several weeks by means of GSR changes. Highly charged, personally relevant words were divided into experimental words and control words, equally matched on emotional-response intensity. The satiation treatment consisted of three 40-min. periods occurring once a week, with the outcome that the formerly highly charged words that were satiated yielded significantly lower GSR tracing than did the highly charged but unsatiated words. The satiation effect persisted for at least a week, i.e., the time lapse between the last satiation session and the post-satiation test. GSR levels dropped more quickly after the first satiation, and continued to drop throughout the rest of the satiation sessions. Thus, the interpretation of the effects of reactive inhibition as the sole process involved in satiation was questioned.

191. Dickson, H. W., & McGinnies, E. Affectivity in the arousal of attitudes as measured by galvanic skin responses. American Journal of Psychology, 1966, 79, 584-589.

Pro- and anti-church, and neutral attitudes were measured on the assumption that these attitudes are emotionally supported. From 486 students in an introductory psychology course, 3 groups of 20 Ss each were chosen; each having pro-church, anti-church, or neutral attitudes. GSRs were taken while taped statements were presented. The pro- and anti-church groups showed higher GSRs to statements which contradicted their measured attitudes. The results favor the hypothesis that extremes in attitudes have affective components, and also that autonomic responses are elicited more strongly when attitudes are challenged than when they are reinforced.

192. Diethelm, O., Fleetwood, M. F., & Milhorat, A. T. The predictable association of certain emotions and biochemical changes in the blood. Proceedings of the Association for Research in Nervous and Mental Diseases, 1953, 29, 262-278.

The studies of the relationship between various emotions and certain physiologic effects of blood samples of the subjects have advanced to the point where one can predict the type of reaction that will be observed in the presence of certain emotions (e.g. resentment, elation, etc.).

The methods used in determining these effects on the isolated duodenum, vagina, and abdominal rectus muscle are described briefly. Three types of effects produced by the blood of subjects are observed:

Type 1--An acetylcholine-like effect correlated with tension.

Type 2--An effect elicited only on the atropinized duodenum and associated with resentment.

Type 3A--An epinephrine-like effect produced by the blood of subjects showing anxiety as a prominent emotion.

Type 3B--An effect, found in the presence of guilt or acute anger.

The correlation of the physiologic findings and the emotions has permitted improvement in the psychologic and psychopathologic methods for evaluation of the types and intensity of the emotions. These studies have shown the inadequacy of considering emotional reactions as a single predominant emotion, and have emphasized the need to analyze the various emotions present in such states.

193. Diggory, J. C., Klien, S. J., & Cohen, M. Muscle-action potentials and estimated probability of success. Journal of Experimental Psychology, 1964, 68, 449-455.

This experiment bears on the question of the conditions under which actual or expected failure will lead to an increase or to a decrease in muscular effort expended on a task. Action potentials (MAP) from the working muscles are taken as the index of effort. Previous reports that MAP increased after failure are interpreted to mean the Ss viewed the second task as a chance to offset the effects of the failure by performing well. But it is supposed that if S is convinced that achieving success is hopeless under given task conditions then he will reduce his effort, i.e., produce smaller MAPs. Previous experiments had shown that the form and level of (false) performance curves, reported to Ss during a series of trials, produced systematic effects on the trend and level of their estimated probability of success, P(s). These observations were replicated in the present experiment, with the additional finding that level of MAP is a function of level of P(s). That is, Ss who expected to succeed put out more effort than those who expected to fail.

194. DiMascio, A., Boyd, R. W., & Greenblatt, M., Physiological correlates of tension and antagonism during psychotherapy: A study of interpersonal physiology. Psychosomatic Medicine, 1957, 19, 99-104.

1. The higher the number of "tension" scores for patient during a given interview, the higher the patient's heart rate. The higher the number of "tension release" scores for the patient the lower the patient's heart rate. In general, the patient's heart was most stable in the instances when the rate was fast and least stable when it was slow.

2. The higher the number of "tension" scores for patient during a given interview the higher the therapist's heart rate during that interview and the lower his heart lability. There was a tendency for the therapist's heart rate and lability to follow a pattern similar to that of the patient.

3. For "antagonism" the patient and therapist tended to manifest opposite trends in cardiac functioning: the patient's heart rate would slow down whereas therapist's would speed up.

4. The patient appears to express "tension" more through his heart rate than skin temperature and "antagonism" through his skin temperature rather than heart rate. Thus the different "emotions" noted in this subject during psychotherapy tend to be expressed through different peripheral physiological pathways.

195. Dittes, J. Extinction during psychotherapy of GSR accompanying "embarrassing" statements. Journal of Abnormal & Social Psychology, 1957, 54, 187-191.

Statements by a therapy patient acknowledging personal sexual behavior or desire were frequently accompanied during early hours of therapy with galvanic skin responses but not during later hours, following a progressive decline. This finding is taken as evidence that the GSR is associated with such feelings as fear or embarrassment in the interpersonal relationship with the therapist and that such feelings extinguish during therapy.

196. Dittes, J. Galvanic skin response as a measure of patient's reaction to therapist's permissiveness. Journal of Abnormal and Social Psychology, 1957, 55, 295-303.

Two different measures of resistance are negatively correlated with the permissiveness of the therapist. However, the attempt to show that this relationship is mediated by the "anxiety" or "readiness" which the GSR measures is obscured by the finding that the GSR is related to the emotional significance of the patient's speech, as well as to the permissiveness of the therapist.

197. Diven, K. Certain determinants in the conditioning of anxiety reactions. Journal of Psychology, 1937, 3, 291-308.

Ten experiments are described which center upon an attempt to obtain experimental evidence on the chain of clinical hypotheses commonly employed in discussing the neuroses. A method of conditioning the galvanic skin response to words, was combined with the Luria technique, an association test composed of rural and urban words, and the subject's report. It was attempted to get indicators working on all three levels of nervous activity, and to get both conscious and unconscious processes into the situation. The results include conditioning of the G. S. R. and displacement of the effects (emotional, autonomic, and skeletal) to the critical word and to all the words in the class to which it belonged. Only 21 of 52 S's could report that the critical word was the cue for the shock. The number of words recalled is increased, and the increase is specific to the class of words to which the critical word belonged, following deconditioning.

198. Dixon, N. F. The effect of subliminal stimulation upon autonomic and verbal behavior. Journal of Abnormal and Social Psychology, 1958, 57, 29-36.

The hypotheses tested were that:

1. Response latencies and GSRs would be determined by the affective value of the stimulus material.
2. The verbal guesses made during subliminal stimulation would be associations to the stimulus items as shown by the subject's ability to indicate subsequently that stimulus item to which each response had been given.

For the experiment, seven subjects were each presented at a subliminal intensity with 12 items of stimulus material, dichotomized regarding their emotional values, in four consecutive trials. GSRs, response latencies, and verbal guesses were recorded for each presentation. Subsequently, each subject was presented with his responses and asked to match these against the 12 stimulus items.

1. Little evidence was found to support the hypothesis that response latency would be a function of the emotional value of the stimulus material.
2. The GSR hypothesis, however, was supported at a significant level of probability.
3. That the significant relationship between GSRs and the stimulus material justified the assumption of a causal relationship between the subliminal stimulus and the verbal response, received support from the second part of the experiment in which it was found that the group as a whole were able to match their verbal responses against the appropriate stimulus items to an extent that was statistically significant. That the responses were, in fact, responses to meaning was further supported by the subjects' ability to match them against the synonyms of the stimulus item by which they had been evoked. The results as a whole were considered to be supportive of the subception hypothesis.

199. Dreher, R. E. The relationship between verbal reports and galvanic skin responses to music. American Psychologist, 1948, 3, 275-276. (Abstract)

The results for the trained group were interpreted to represent a differential esthetic responsiveness--built up in the course of musical training--to the moods of musical stimuli. The absence of such differential responsiveness in the untrained group, despite its ability to make gross differentiations of musical moods, was interpreted as a lack of esthetic response to music.

200. Drvota, S., & Student, V. Muscular tension during stress interviews with aggressive and anxious patients. Activitas Nervosa Superior, 1965, 7, 199-200.

The records taken in this experiment revealed a definitive evidence that the muscular tension changes correspond specifically to the descriptions of overt bodily actions made by the experimental subjects during the interview.

The shifting of the subjects' attention from the interview setting with spontaneous responses to a deliberate imagination of specific traumatic situations provoked a general decrease of muscular tension.

201. Duffy, E. Activation and behavior. New York: John Wiley, 1962.

This report contains some material that relates physiological indicants to attitude-like elements (e.g., see Chap. 10 Behavior correlates of individual differences in activation).

202. Duke, J. D. Lateral eye movement behavior. Journal of General Psychology, 1968, 78, 189-195.

Some observations by Day pertaining to lateral eye movements are confirmed by research data collected by the experimenter. After complex or reflective questions, a subject will momentarily break his gaze upon the experimenter. He will laterally turn his eyes to the right or left before responding. Simple questions seldom elicit eye movement behavior. The direction chosen is characteristic for individuals, but not for the group. Males more consistently than females turn in one direction only. Eye dominance is independent of the phenomenon. Gazing interactions are replete with research potential for interested investigators.

203. Dunbar, H. F. Emotions & Bodily Changes. New York: Columbia Univeristy Press, 1948.

The author gives an extensive review of physiological measurements in psychology. Fundamental to all instruments of physiological measurement which have been considered for research in the field of emotion is the inclusion of the time factor, results being obtained usually in the form of curves. The author points out, for example, that for psychogalvanic measurements neither resistance nor its first derivative, which is the psychogalvanic reflex, but rather the second derivative, or rate of change of the reflex, seems to be most closely related to the psychic factors which we desire to measure.

Some of the studies reviewed use physiological measures as a measure of the affective values or emotional significance of various stimuli.

204. Dykman, R. A., Ackerman, P. T., Galbrecht, C. R., & Reese, W. G. Physiological reactivity to different stressors and methods of evaluation. Psychosomatic Medicine, 1963, 25, 37-59.

Twenty medical students were subjected to 2 stress situations during their junior and senior years in medical school. In the junior year, the stressors were a series of nonreinforced tones followed by a series of emotional questions. In the senior year, the stressors were successive series of digits the subjects recited backwards, each series preceded by a warning tone. The senior experiment consisted of 2 phases: the first 12 digit series presented without criticism and each of the second 12 digit series followed by a critical comment. Skin-resistance, heart-rate, and respiratory-rate levels and changes were continuously recorded in both the junior and senior experiments. Muscle potentials also continuously recorded, were added to the battery of physiological measures in the senior test. The purpose of these experiments was to evaluate certain determinants of physiological reactivity.

205. Dykman, R. A., Reese, W. G., & Galbrecht, C. R. A method for studying psychophysiological adaptation to novel signals. Psychiatric Research Reports, 1960, 12, 53-64.

A section of this report deals with differences in GSR responses to emotional and non-emotional questions.

206. Dykman, R. A., Reese, W. G., Galbrecht, C. R., Ackerman, P. T., & Sundermann, R. S. Autonomic responses in psychiatric patients. Annals of the New York Academy of Sciences, 1968, 147, 237-303.

Portions of this study report on the relation between autonomic responses and questions having attitudinal import, e.g., "How do you feel about your mother?"

207. Dykman, R. A., Reese, W. G., Galbrecht, C. R., & Thomasson, P. J. Psychophysiological reaction: to novel stimuli: Measurement, adaptation, and relationship to psychological and physiological variables in the normal human. Annals of the New York Academy of Sciences, 1959, 79, 43-107.

Forty males underwent 15 minutes of rest, then 18 minutes of tone, and then thought about answers to a series of questions with concurrent skin resistance, heart rate, and respiration recording. Findings were most marked with skin resistance. Results are considered in terms of intercorrelation, change in time, and initial level. Personality variables of anxiety, defensiveness, apprehension, intelligence, and achievement motive are also related to these data.

208. Dysinger, D. W. A comparative study of affective responses by means of the impressive and expressive methods. Psychological Monographs, 1931, 41 (Whole No. 4).

The Hathaway psychogalvanic response apparatus was used in connection with a list of stimulus words to determine the relationships between measures of psychogalvanic reaction and of affective response. The results show that the magnitude of the deflection resulting from the exposure of the stimulus word indicates to some extent the degree of the affective state: the deflections which accompanied the responses characterized as "very" pleasant or unpleasant were larger, in 67.5% of the cases, than those characterized merely as pleasant or unpleasant. In most of the remaining cases this correspondence was suggested, and in a few cases it was lacking.

209. Dysinger, W. S., & Ruckmick, C. A. The emotional responses of children to the motion picture situation. New York: Macmillan, 1933.

Dysinger and Ruckmick studied the emotional effects produced by motion pictures in children and adults by means of psychogalvanic and pulse records, and verbal reports. Records were made both in the laboratory and at the theater on 150 subjects ranging in age from 6 to 50 years. Emotional incidents in 7 different pictures were itemized and records of the bodily effects produced by them analyzed. Wide individual differences resulted. Repetitions of a picture aroused diminished emotional response. Reactions to danger and conflict were greatest in children, and especially in boys, under twelve. The 16-year level gave the greatest response to love scenes. In general, the most extreme stimulation occurs near the age of 16. The adult reaction was found not to be a valid criterion of the reaction of younger ages. Younger children do not perceive pictures as wholes, but as numerous separate incidents.

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210. Eckstrand, G., & Gilliland, A. R. The psychogalvanometric method for measuring the effectiveness of advertising. Journal of Applied Psychology, 1948, 32, 415-425.

In conclusion, it may be stated that this study adds positive evidence in behalf of the hypothesis that, under properly controlled conditions, the effectiveness of advertising material can be predicted by the psychogalvanic method. Further work is needed, of course, with different types of advertising material and with material of different degrees of effectiveness. However, the technique gives promise as an objective evaluation of ads and advertising appeals.

211. Edelberg, R. Response of cutaneous water barrier to ideational stimulation: A GSR component. Journal of Comparative and Physiological Psychology, 1966, 61, 28-33.

Artificially increasing local surface humidity of human skin, produced a sudden inward passage of water in response to various alerting or ideational stimuli, often with emotional components. This reflex occurred only with an electrodermal response and was associated with the positive wave of the skin potential response. It may occur when the sweat glands are producing sweat. It is interpreted as an indication of a transient increase in epidermal permeability to water, 1 of 2 independent reflexes comprising the GSR. The increase in cutaneous permeability demonstrated here by absorption of water from humid air would also result in an outward movement of water into drier air and constitutes a likely source of error in studies of sweat gland—GSR relations.

212. Edelberg, R., Burch, N. R., Bloom, S. W., & Lhamon, W. T. The galvanic skin reflex as an affect indicator in small group interaction. Paper presented at Annual Conference on Behavioral Sciences, AF OSR, Washington, D. C., November 1958.

The correlations indicate that changes in GSR frequency of the group are associated positively with change of positive affect, negatively with changes of negative affect, and it seems possible that affect shifts of the group as a whole may be monitored by observation of the GSR pattern. Observations of the individual patterns show that there is actually little correlation between positive affect and GSR frequency except as a consequence of the reciprocal relation between positive and negative affect time. Further inspection of individual results reveals that the relationship between negative affect and GSR frequency is a reflection of the association of GSR with both negative affect received and negative affect produced. The relationships between affect and GSR cannot be explained by the effect of vocalization per se on GSR since there is not a significant correlation between vocalization time or number of initiations by an individual and his GSR pattern.

213. Edwards, A. E., & Hill, R. A. The effect of data characteristics on theoretical conclusions concerning the physiology of emotions. Psychosomatic Medicine, 1967, 29, 303-311.

Twenty-four Ss were exposed 4 times to 6 differing stimulations while their verbal reports and 6 electrophysiological variables were recorded. The data were digitized in 4 different manners: state, change, precovariied state, and precovariied change. Each was then subjected to a components-of-variance analysis stratifying on all of the aforementioned theoretical viewpoints. This form of analysis is not so much concerned with which theoretical view is significant (as expected, all were) but rather with the question of how important (percentage of total variance accounted for) a viewpoint becomes as a function of which transform is chosen.

It was demonstrated that the chosen transform is apt to influence strongly the theoretical conclusion of the experimenter, and further, that highly significant results may be obtained with an effect accounting for only a trivial amount of the variance.

214. Edwards, A. E., & Treadwell, T. Cardiovascular response to experimentally induced repressed anger. Proceedings of the 75th Annual Convention of the American Psychological Association, 1967, 2, 183-184.

The findings generally support the involvement of the total cardiovascular system during response-contingent aversive stimulation. The effect does not appear to be attributable simply to the presence of aversive stimulation or to being alerted to a recurrent motivating stimulus. It is felt that the latter two distinctions are necessary for the proper interpretation of a response contingent operation. Although the data are not presented here, it is certain that all three of the situations employed affected the cardiovascular system when compared with a "resting" state. The important thing is the particular effect that response contingent aversive stimulation has.

In any event, aversive stimulation in the environment is certainly a common phenomenon. It would also appear that whether the individual is attempting to control such stimulation or not is at least relevant to his cardiovascular system.

215. Edwards, D. C., & Alsip, J. E. Intake-rejection, verbalization, and affect: Effects on heart rate and skin conductance. Psychophysiology, 1969, 6, 6-12.

Visual tasks judged to require stimulus intake or stimulus rejection were accompanied by instruction to verbalize or not to verbalize as they were presented to male students. Heart rate and skin conductance measures indicated that (1) Lacey's directional fractionation occurred to intake stimuli which were rated pleasant and to those rated unpleasant; (2) an instruction to verbalize following the task increased HR within the limits of a supposed ceiling effect, removing evidence of directional fractionation; and (3) there was no direct relationship between the measures and rated affect. The conclusions of other researchers were examined in relation to these findings.

216. Eisler, R. M. The relationships among thematic sexual responses, sexual conflict, sex of examiner and arousal under varying conditions of stimulus relevance. (Doctoral dissertation, State University of New York at Buffalo) Ann Arbor, Mich.: University Microfilms, 1967. No. 67-10, 131.

The purpose of the present investigation was to explore the relationships among self-reported sexual conflict, sex of examiner, and stimulus relevance with respect to thematic sexual responses and GSR arousal. In accord with Miller's model of conflict behavior, it was predicted that High Sex Conflict subjects (HSCS) would give stronger approach responses to stimuli which were highly relevant to sex than Low Sex Conflict (LSCS) subjects, and that HSCS subjects would give stronger approach responses to stimuli of low relevance. It was also hypothesized that male subjects responding to a female examiner would give weaker approach responses than to a male examiner as a function of inhibition, and that HSCS subjects would give weaker approach responses to a female examiner than LSCS subjects as a function of sex anxiety.

As expected, the results indicated that LSCS subjects gave stronger approach responses on both content and affect measures to high sex relevance stimuli than HSCS subjects. While there was a tendency for HSCS subjects to give stronger approach responses to the high sex relevance stimuli, this did not attain statistical significance necessary to confirm the prediction. While not predicted, it was found that pictures depicting heterosexual interaction elicited more positive affect and greater approach content than pictures depicting single female figures. This was discussed as being consistent with a theory of "interpersonal relations." Contrary to expectations, there was no difference between HSCS and LSCS subjects as a function of sex of examiner.

217. Ellingson, R. J. Brain waves and problems of psychology. Psychological Bulletin, 1956, 53, 1-34.

Since World War II numerous advances have been reported dealing with the relationships between brain waves and psychological processes. These studies are summarized and discussed under the categories of sleep and wakefulness, sensation, response processes, perception, emotion, personality, and complex processes. "Each new discovery seems to reveal the brain as an even more versatile organ than was previously appreciated. The major advances in the areas discussed have unquestionably stemmed from the delineation of anatomical connections and physiological functions of the reticular formation of the lower brain stem and the diffuse thalamic projection system."

218. Elliott, R. Physiological activity and performance: A comparison of kindergarten children with young adults. Psychological Monographs, 1964, 78, (10, Whole No. 587).

Twenty-one adults and 41 kindergarten children performed repeated blocks of trials of simple auditory reaction time (RT), sometimes for incentives, sometimes not, while EEG and other physiological responses were recorded. Children differed from adults in that they manifested (a) no covariation between quality of performance and level of physiological activity; (b) far lower intra-individual correlations between one physiological response and another; (c) no adaptation over the session; (d) far weaker relations between preparatory (interstimulus) intervals and RT; and (e) increases, rather than decreases, in the amplitudes of the various EEG frequencies with increasing motivation and physiological activity. These differences were considered in the light of certain important similarities in response between the children and various groups of adults.

219. Elliott, R. Reaction time and heart rate as functions of magnitude of incentive and probability of success. Journal of Personality and Social Psychology, 1965, 2, 604-609.

The effects of 3 probabilities of success (PS) and 3 magnitudes of incentive (MI) upon reaction time (RT) and heart rate (HR) were examined in 3 Ss, each repeating the matrix of conditions 10 times. Results depended upon Ss' experience, with significant motivational effects on HR during the early sessions, but not later, and significant effects on speed during the later days, but not the earlier. The effects of PS and MI upon RT were interactive.

220. Elliott, R. Effects of uncertainty about the nature and advent of a noxious stimulus (shock) upon heart rate. Journal of Personality and Social Psychology, 1966, 3, 353-356.

Heart rate (HR) and ratings of tension were obtained from 6 groups of 10 randomly selected male undergraduates while they awaited a shock. A group knew or did not know when the shock would arrive, and knew that the shock would be mild, that it would be strong, or knew nothing about it. The only significant effect on both the HR acceleration scores and the tension ratings was associated with whether or not S knew anything about the nature of the shock to come.

221. Elliott, R. Physiological activity and performance in children and adults: A two-year follow up. Journal of Experimental Child Psychology, 1966, 4, 58-80.

Twelve adults and 32 second-grade children repeated an experimental session they had been in 2 years before, doing auditory reaction time (RT), sometimes for incentives, sometimes not, while EEG and other physiological responses were recorded. Children manifested changes in the direction of adult-like responsiveness in that there were greater degrees of covariation among autonomic responses, greater responsiveness of autonomic and muscle tension variables to the prospect of incentives, and a greater relation between reaction speed and levels of autonomic activity. EEG frequencies increased, and EEG blocking became more frequent among the children. The EMG response showed few signs of maturing, and there was no evidence for the development of a strong temporal response set as the cause of the marked improvements in reaction speed.

222. Elliott, R. Reaction time and heart rate as functions of magnitude of incentive and probability of success: A replication and extension. Journal of Experimental Research in Personality, 1966, 1, 174-178.

A modification and replication of a previous study on the effects of probability of success (PS) and magnitude of incentive (MI) upon heart rate (HR) and reaction time (RT) makes possible the following conclusions: The method of establishing PS is flexible, accurate, and convincing to S; effects of MI and PS were very weak on HR; they were significant on RT, changing in nature over the ten experimental days; and no lawful relation existed between RT and HR.

223. Elliott, R. Tonic heart rate: Experiments on the effects of collative variables lead to a hypothesis about its motivational significance. Journal of Personality and Social Psychology, 1969, 12, 211-228.

Five experiments assessed the effects of conflict and uncertainty on tonic heart rate (HR) in a variety of situations, including comparisons of having versus not having control over an escape response from shock, making easy versus hard tone discrimination, naming colors or reading names of colors versus naming the hue of an incompatible color-word (Stroop test), and performing in a reaction-time task with predictable versus unpredictable preparatory intervals. These collative variables either had no effect on tonic HR or they had an effect (deceleratory) opposite to expectations; but response factors and incentive factors had strong accelerating effects. A hypothesis is stated to the effect that under the usual boundary conditions of the psychological experiment, the critical features controlling tonic HR acceleration are the instigation, anticipation, and initiation of responses, and the presence of incentives. Studies are reviewed in which "emotionality" was present but in which no rise in tonic HR occurred unless either of the two features was present. Other studies are reviewed in which both HR and palmar conductance (PC) were used, and a hypothesis about the difference in their motivational significance is suggested.

224. Elliott, R., Banhart, B., & Light, T. Differences in the motivational significance of heart rate and palmar conductance: Two tests of a hypothesis. Journal of Personality and Social Psychology, 1970, 14, 166-172.

The hypothesis states that palmar conductance (PC) is particularly sensitive to the collative (arousing), while heart rate (HR) is particularly sensitive to the action-instigation (activating) properties of stimulus compounds. It was predicted, and confirmed, that on the Stroop Color-Word Interference Test HR would fall with increasing difficulty of task, while PC would concomitantly rise. It was predicted, and partially confirmed, that PC would rise while HR fell in anticipation of shock.

225. Ellis, D. S., & Brighthouse, G. Effects of music on respiration and heart rate. American Journal of Psychology, 1952, 65, 39-47.

All of the statistically significant increases were in respiration-rate. One of the 3 selections (Hungarian Rhapsody) causes significantly greater increases in respiration than either of the other 2. Two of the selections (Hungarian Rhapsody and Blue Interval) cause increases in respiration in almost all of the Ss. There was no correlation among the Ss' changes in respiration during the 3 musical selections. None of the musical selections was accompanied by statistically significant changes in heart-rate.

226. Ellson, D. G. A report of research on detection of deception. September 15, 1952, Indiana University, Contract No. N60onr-18011, Office of Naval Research.

The report conveniently divides into two parts. Part I contains reports of the more complete exploratory studies, in most of which a single response, such as the g.s.r., muscle action potentials, or eye movements was examined in relation to deception. Part II contains two related major experiments in which a number of response variables were measured simultaneously and discussion of the physiological and psychological background which influenced the choice of variables investigated in these experiments. In the first experiment the extent to which each variable was related to deception was determined separately. In addition, a treatment of the data called discriminant analysis was applied in order to determine an optimum weighting of the variables in combination. In the second experiment the procedure was duplicated with a new group of subjects (and an increased number of repetitions of critical questions) in order to validate the weights determined in the first.

227. Emrich, H., & Heinemann, L. G. EEG bei unterschwelliger Wahrnehmung emotional bedeutsamer Wörter (EEG with subliminal perception of emotionally significant words). Psychologische Forschung, 1966, 29, 285-296.

Emotional and neutral words slowly becoming visible with increasing brightness on a translucent screen were observed by 16 healthy subjects whose electroencephalograms and electrocardiograms were continuously recorded. They had to signalize the appearance of light, the visibility of contours or letters, the moment when they could guess a word, and the moment when the word was plainly visible.

In a far subliminal range already significant differences were found between emotional and neutral words in EEG and ECG. Taking into consideration similar findings by other authors an absolute threshold is postulated: the threshold of conscious perception (1st signal) is higher and inconstant. During the exposition of emotional words the abundance of alpha waves was higher. The ECG differences disappeared in the supraliminal range.

It is concluded that the inhibition of perception -- in this case by emotional repression -- is manifested electroencephalographically by increased abundance of alpha waves.

228. Epstein, S. Toward a unified theory of anxiety. In B. A. Maher (Ed.), Progress in experimental personality research, Vol. 4. New York: Academic Press, 1967. Pp. 4-89.

A portion of this study deals with the physiological changes that occur in novice and experienced parachutists from the time they arrive at the airport until the time they land. Data are also reported which relate physiological responses to a set of words containing four levels of relevance to parachuting.

229. Epstein, S. Anxiety, reality and schizophrenia. Schizophrenia, 1970, 2, 11-35.

Sections of this report review: (1) data relating autonomic responses of sport parachutists to words rated on their relevance to parachuting, and (2) data relating autonomic responses of schizophrenics to words rated for their socio-emotional disturbance value.

230. Epstein, S., & Bahm R. Verbal hypothesis formulation during classical conditioning of the GSR. Journal of Experimental Psychology, in press.

Two groups of 16 Ss, one of which gave verbal estimates of the likelihood of receiving shocks throughout the experiment, and one which did not, were tested in a conditioning situation designed to eliminate "reflex" ORs. The CS consisted of rectangles of uniform size arranged along the perimeter of a circle, around which moved a constant-speed pointer. The UCS was a shock delivered at the end of the CS. Verbal estimates facilitated conditioning, and caused the acquisition curve to resemble that of other forms of conditioning, rather than to decrease during reinforcement as was found for the nonverbalizing group and is typically found in GSR conditioning. The combined data from GSRs, verbal estimates, and post-session interviews provided a relatively comprehensive picture of cognitive processes during conditioning, which were more complex than initially suspected.

231. Epstein, S., & Clarke, S. Heart rate and skin conductance during experimentally induced anxiety: Effects of anticipated intensity of noxious stimulation and experience. Journal of Experimental Psychology, 1970, 84, 105-112.

Thirty Ss were divided into three groups according to instructions designed to produce an overestimate, an underestimate, or a correct estimate of the intensity of an unavoidable, noxious sound stimulus delivered on the tenth count of a 20-point count-up presented six times. Major findings were: (a) Physiological arousal during the anticipatory period was directly related to anticipated intensity of noxious stimulation; (b) since the high-threat group showed the greatest reaction to impact but later rated the stimulus as least intense, it was concluded that immediate impact varies directly with expectancy, while reappraisal is influenced by the contrast between the real and the expected stimulus; (c) over trials, there was a reduction in reactivity and the groups became more alike; (d) for heart rate, an increase in deceleration immediately before impact served to reduce heart rate immediately following impact.

232. Epstein, S., & Fenz, W. D. Theory and experiment on the measurement of approach-avoidance conflict. Journal of Abnormal and Social Psychology, 1962, 64, 97-112.

To investigate the effect of approach-avoidance conflict upon GSR and the content and reaction time in a word association task, parachutists were tested on the day of a scheduled jump and either 2 weeks before or after the jump. Gradients of anxiety were higher on the day of the jump for all Ss, as measured by the dependent variables, as compared to the pre- and postjump periods.

233. Epstein, S., & Fenz, W. D. Steepness of approach and avoidance gradients in humans as a function of experience: Theory and experiment. Journal of Experimental Psychology, 1965, 70, 1-12.

Thirty-three experienced and 33 novice parachutists rated their approach and avoidance feelings at different points in time preceding and following a parachute jump. For the novice parachutists, self-rated avoidance increased up to a point shortly before the jump, and then decreased. For the experienced parachutists, self-rated avoidance increased up to the morning of the jump, decreased to the jump, and increased after the jump. It was concluded that with experience the point of greatest anxiety is displaced backward in time. To account for this phenomenon, a miniature theory was presented which assumed that with continuous exposure to threat, 2 developments take place, a heightening of the gradient of anxiety and the development of a gradient of inhibition of anxiety, the latter having the steeper slope.

234. Epstein, S., & Fenz, W. D. The detection of areas of emotional stress through variations in perceptual threshold and physiological arousal. Journal of Experimental Research in Personality, 1967, 2, 191-199.

The study was undertaken to evaluate a technique for measuring motivation and conflict by obtaining thresholds for cues arranged along a dimension while monitoring physiological reactions. Forty Ss were tested with a word-perception test and a word-association test containing parallel dimensions of emotion-arousing words. Highly reliable gradients of increasing threshold were found as a function of the increasing stimulus dimension for thresholds inferred from GSRs and for thresholds recorded by a motor response by S. Highly reliable gradients of increasing magnitude of GSR were found for both the word-perception and word-association test. A reversal of the relative steepness of the GSR gradients of Sensitizers and Repressers on the two tests suggested the hypothesis that Repressers are more prone to defend against anxiety at a perceptual level and Sensitizers at a nonperceptual level of response.

235. Epstein, S., & Roupelian, A. Heart rate and skin conductance during experimentally induced anxiety: The effect of uncertainty about receiving a noxious stimulus. Journal of Personality and Social Psychology, in press.

Forty-five Ss were divided into 3 equal groups differing in expectancy for receiving an unavoidable noxious stimulus on the count of 10 in a 15 number count-up. One group was told that the likelihood of receiving a shock was 5%, another 50%, and another 95%. Two trials were presented. In the first no S received a shock; in the second all Ss received a shock. For both heart rate and skin conductance, the 5% Expectancy Group exhibited the greatest, and the 95% Group the least, arousal during the anticipatory period. On both measures, the 5% Expectancy Group exhibited the greatest impact effect. It was concluded that within limits, low expectancy about the occurrence of an unavoidable threatening event increases anticipatory anxiety as well as the reaction to impact.

236. Epstein, S., & Taylor, S. P. Instigation to aggression as a function of degree of defeat and perceived aggressive intent of the opponent. Journal of Personality, 1967, 35, 265-289.

In a competitive task, S or his opponent received any of 5 intensities of shock set by the other, depending upon whose RT was faster. After each trial, each received feedback on the shock settings of the other, regardless of outcome. In reality, there was no opponent, and both the extent to which S was defeated and the presumed aggressive intent of his opponent were varied according to the requirements of an orthogonal design in which each variable was represented at 3 levels. Dependent variables included (1) behavioral aggression as determined by the shock settings of S; (2) autonomic arousal, as measured by heart rate, skin conductance, and blood pressure; and (3) ratings by S of himself, his opponent, and of his opponent's perception of him. The major findings were: (1) Aggressive intent of the opponent was directly associated with an increase of unfavorable ratings of the opponent, an increase in the behavioral aggression directed at him, and an increase in autonomic arousal. (2) Defeat was not significant as a main effect for any of the above variables.

237. Ershova, A. P. Emotsional'naya reaktivnost' kak komponent sposobnosti k akterskumu isskustvu. (Emotional reactivity as a component of acting ability). Voprosy Psikhologii, 1968, 14, 140-148.

GSR, EKG and EEG recordings were recorded for high school students who were members of a dramatic club. Ss were instructed to imagine themselves in various specified emotional situations. Mean amplitudes of these recordings were found to correlate positively with judged acting ability.

238. Eysenck, H. J. Extraversion and the acquisition of eyeblink and GSR conditioned responses. Psychological Bulletin, 1965, 63, 258-270.

A summary is given of studies relating eyeblink and GSR conditioning to the personality dimension of extraversion (E). It is found that extraverts are poorer in eyeblink conditioning when conditions favor the development of inhibition, as by the use of partial reinforcement; they do not differ from introverts when conditions are such as to preclude the development of inhibition. Extraverts are poorer in GSR conditioning when relatively mild stimuli are used, but do not differ from introverts when very strong stimuli are used, making impossible the development of cortical inhibition. They are also poorer than introverts when discrimination learning is involved, facilitating the growth of inhibition. Correlations between conditioning and personality appear to be dependent on the suitability of experimental conditions to evoke cortical inhibition; correlations are process and not status functions. These findings have implications for the problem of the generality of the hypothetical factor of "conditionability."

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239. Faure, J. Etude electroencephalographique des modifications de l'affectivite. (Electroencephalographic studies of affect modification.) Electroencephalography and Clinical Neurophysiology, 1950, 2, 106. (Abstract)

Determined the relation between EEG changes and affective stimuli chosen from Rorschach cards and TAT pictures previously found emotionally significant for each S.

240. Fenz, W. D. Conflict and stress as related to physiological activation and sensory, perceptual, and cognitive functioning. Psychological Monographs: General and Applied, 1964, 78 (8, Whole No. 585).

The study investigated the relationship between stress experienced in a real-life approach-avoidance conflict situation and physiological activation and performance. A 3-dimensional model permitted evaluation of conflict in relation to both temporal and cue dimensions. Twenty-seven sport parachutists were tested 3 different times in relation to a jump. The test consisted of stimuli scaled along a dimension of increasing relevance to parachuting. GSR and absolute level of conductance measured physiological activation. Level of performance was sampled over a wide range of responses, varying from simple sensory functions at one extreme to complex cognitive processes at the other.

241. Fenz, W. D., & Dronsejko, K. Effects of real and imagined threat of shock on GSR and heart rate as a function of trait anxiety. Journal of Experimental Research in Personality, 1969, 3, 187-196.

The study raised the question: What makes for an effective control of autonomic arousal, namely, for the ability to modulate involuntary, autonomic behavior? Individual differences in trait anxiety were found to be a relevant variable. Medium anxious Ss were able to emit GSRs and show heart rate acceleration by merely thinking about a painful event, and to inhibit GSRs and show heart rate deceleration in actual anticipation of the painful event. High anxious Ss showed autonomic excitation and low anxious Ss autonomic inhibition under both conditions.

242. Fenz, W. D., & Epstein, S. Gradients of physiological arousal in parachutists as a function of an approaching jump. Psychosomatic Medicine, 1967, 29, 33-51.

Continuous recording of skin conductance, heart rate, and respiration rate were obtained from experienced and novice parachutist during a sequence of events leading up to and following a jump. While novice jumpers showed a sharp rise in physiological activity up to final altitude, experienced jumpers produced an inverted V-shaped curve--i.e., an initial rise was followed by a decline. It was concluded that with repeated exposure to threat, expanding gradients of activation and of inhibition develop, the latter with steeper slope. The early rise in activation provides an automatic signal of danger, while the inhibitory reaction prevents the arousal from becoming excessive, thus providing a highly adaptive mechanism for the mastery of threat.

243. Fenz, W. D., & Epstein, S. Specific and general inhibitory reactions associated with mastery of stress. Journal of Experimental Psychology, 1968, 77, 52-56.

Sixteen experienced and 16 novice parachutists were administered word-association tests containing dimensions of taboo- and parachuting-relevant words on both the day of a jump and on a control day. On the control day both groups produced monotonic gradients of GSR and reaction time along both dimensions. On the day of a jump the novices produced steeper gradients of GSR and RT along both dimensions, while the experienced parachutists produced less steep monotonic gradients along the taboo dimension and inverted V-shaped curves along the parachuting dimension. It was concluded that there are specific and general inhibitory reactions associated with the mastery of stress.

244. Fenz, W. D., Kluck, B. L., & Bankart, C. P. Effect of threat and uncertainty on mastery of stress. Journal of Experimental Psychology, 1969, 79, 473-479.

Parallel forms of a word association test containing words scaled along a dimension of increasing relevance to parachuting were administered to 20 experienced parachutists at 2-wk. intervals. Ten Ss were given the second test under experimental conditions of threat and uncertainty. It was found that during regular testing conditions Ss produced inverted V-shaped gradients, i.e., stronger GSRs and longer reaction times (RTs) to low-intensity cues than to high-intensity cues. This replicated earlier finding with experienced parachutists. When tested under conditions of threat and uncertainty, Ss showed a reversal in their responses patterns, i.e., monotonic gradients of GSR and RT to the same stimulus dimension. Monotonic gradients are consistently found for novice jumpers. It was concluded that the processes responsible for the backward shift as a function of experience are reversible.

245. Finesinger, J. E. The effects of pleasant and unpleasant ideas on the respiratory pattern (spirogram) in psychoneurotic patients. American Journal of Psychiatry, 1944, 100, 659-667.

Spirogram tracings were analyzed for irregularities in pattern (sighing respirations, minor and major fluctuations, and points off an arbitrary line for the upper and lower border of the tracings) in a series of 64 psychoneurotic patients and 24 normal control subjects during periods of induced ideational (pleasant or unpleasant) stimuli. The data are presented as additional evidence for the thesis that psychoneurotic patients are divisible into two groups with respect to their reactions to these stimuli. Those with hysteria, anxiety neurosis, and reactive depression reacted to unpleasant ideational stimuli with excessive respiratory lability. Those with compulsion neurosis, hypochondriasis, and questionable schizophrenia were less reactive than the controls with respect to rate, depth, and total ventilation, but not with respect to respiratory pattern. There was an increase in sighing respirations with unpleasant ideas in all groups.

246. Fisher, G. L., & Fisher, B. E. Differential rates of GSR habituation to pleasant and unpleasant sapid stimuli. Journal of Experimental Psychology, 1969, 82, 339-342.

A study was done to compare diminution of the GSR to repetitive stimulation by different concentrations of hedonically positive (sucrose), negative (quinine monohydrochloride), and neutral (water) solutions. Each of nine groups of Ss were stimulated by a single concentration of one of the solutions. Habituation of the GSR to the quinine required significantly more presentations than to sucrose or water. Since the orienting reaction sensitizes the individual to potential trauma and since most noxious compounds are potentially toxic, it follows that the GSR component of the orienting reflex (OR) should be slower to habituate to quinine than the other solutions. This hypothesis was supported by obtained data. Quinine

concentration was a significant factor, while sucrose concentration was not. The findings were extended to provide a preliminary evaluation of a conjectured gustatory affect process that is responsible for the repugnance shown when bitter compounds are tasted.

247. Fisher, S. Body image and asymmetry of body reactivity. Journal of Abnormal and Social Psychology, 1958, 57, 292-298.

The hypothesis was proposed that the more definitely an individual distinguishes the right and left sides of his body in his body image, the more likely he is to manifest differential reactivity in the left vs. right sides of his body. Body-image differentiation of right and left sides was studied by means of a technique requiring Ss to compare homologous body parts while viewing them through aniseikonic lenses. Right vs. left body reactivity was measured by simultaneous and balanced GSR recordings from the two body sides. It was found that among the right-handed Ss those clearly distinguishing their right and left body sides were likely to show a GSR gradient such that the left side was more reactive than the right. Those without a clear body-image distinction between the right and left body sides either showed no GSR gradient or were predominantly right reactive. Among the left-handed Ss there was no observable relationship between degree of right-left body-image differentiation and right vs. left GSR. It is considered that the data basically support the hypothesis tested.

248. Fisher, S. A further appraisal of the body boundary concept. Journal of Consulting Psychology, 1963, 27, 62-74.

A series of studies were reviewed which cross-validated and extended previous findings concerning the relationship of two measures of body image boundary definiteness (barrier and penetration scores) to various levels of behavior. Support was found for the view that the more definite an individual's boundaries the more likely he is to manifest relatively higher physiological reactivity in body exterior as contrasted to body interior sectors. There was substantial evidence too that with increasing boundary definiteness there is greater ability to adjust adequately to disablement of one's body, to maintain normal ego intergration, and to be effectively communicative in small group settings. Finally, the rationale was discussed for interpreting the barrier and penetration scores within a body image framework.

249. Fisher, S., & Abercrombie, J. The relationship of body image distortions to body reactivity gradients. Journal of Personality, 1958, 26, 320-329.

"On the basis of a body image frame of reference it was hypothesized that right-handed Ss showing relatively more GSR reactivity on the left side of the body than on the right would manifest fewer body image distortions than right-handed Ss showing either right GSR directionality or no gradient at all.....The results definitely supported the hypothesis proposed."

250. Fisher, S., & Cleveland, S. E. An approach to physiological reactivity in terms of a body-image schema. Psychological Review, 1957, 64, 26-35.

"We have suggested. . . . that patterns of physiological reactivity may be meaningfully viewed in terms of a contrast between body-exterior response and body-interior response. More specifically, it was postulated that those who, in their body image, emphasize the armored thickness of their body exterior would show relatively greater physiological reactivity in their exterior body layers (skin and muscle) than in their body interior. The converse of this was postulated to hold true for individuals who conceive of their body-image boundaries as permeable and easily penetrated. A range of literature has been reviewed which seems to lend support to such postulations."

251. Fisher, S., & Osofsky, H. Sexual responsiveness in women: Physiological correlates. Psychological Reports, 1968, 22, 215-226.

Forty-two women described their degree of sexual responsiveness and also the quality of their sexual experiences. A variety of measures of physiological reactivity (e.g., heart rate, vaginal temperature, GSR) were also obtained from them. The chief positive finding was that those who experienced intercourse as having an intense, arousing quality followed by relaxation in the post-orgasm period were characterized by relatively high levels of physiological arousal in a setting with numerous sexual connotations.

252. Flanagan, J. Galvanic skin response: Emotion or attention? Proceedings of the 75th Annual Convention of the American Psychological Association, 1967, 2, 7-8.

Present results indicate that the concept of attention is a better intervening variable interpretation of GSR than is the concept of emotion. Experienced GSR researchers have repeatedly indicated this conclusion. However, those interested in personality have continued to interpret GSR as an index of emotion or anxiety. One thing that the GSR cannot indicate is continued strong emotion or anxiety because if adrenalin is involved, the GSR is suppressed! The distinction is also of importance to experimental designs because the accidental variables that are relevant to attention (i.e., novelty, suddenness, expectancy, etc.) are typically ignored by experimenters who regard the GSR as an index of emotion or anxiety.

253. Floch, M. Limitations of the lie detector. Journal of Criminal Law, Criminology and Police Science, 1950, 40, 651-653.

Findings of the lie detector are dubious in cases of asocial, antisocial, and pathological liar types. The lie detector does not reach those who through gradual self-suggestion deny their crime.

254. Folkins, C. H., Lawson, K. D., Opton, E. M., Jr., & Lazarus, R. S. Desensitization and the experimental reduction of threat. Journal of Abnormal Psychology, 1968, 73, 100-113.

A systematic desensitization procedure and 2 of its components were tested for ability to reduce stress responses in a laboratory threat situation. Ss received 1 of 4 types of training procedures before exposure to a stressful film: an analogue of therapeutic desensitization, relaxation, cognitive rehearsal, or no-training control. Stress response during the showing of a dramatic film on industrial accidents was measured by concurrent self-report, heart rate, and skin-conductance measures. The results showed that the separate components of desensitization --relaxation and cognitive rehearsal-- were as effective alone as when combined in the complete desensitization program. On several measures, cognitive rehearsal appeared to be the most effective threat reducer. Further recognition and exploration of "insight" functions served by such behavior-therapy techniques as systematic desensitization is urged.

255. Forrest, D. W. The role of muscular tension in the recall of interrupted tasks. Journal of Experimental Psychology, 1959, 58, 181-184.

This experiment was designed to discover whether the high level of muscular tension which has been shown to occur after the interruption of a motor task is a possible somatic basis for the Zeigarnik effect. To this end two groups of Ss were employed, one task-oriented, the other ego-oriented. An EMG record was taken from the active arm during the performance of eight mirror-drawing tasks, half of which were interrupted.

As the ego-oriented group showed the expected reversal of the Zeigarnik effect, and as in both groups it was found that more muscular tension occurred after interruption than after completion, it was concluded that the increased tension was not a necessary concomitant of enhanced recall.

256. Forrest, D. W., & Dimond, S. J. Association between galvanic skin response and Rorschach performance. Psychosomatic Medicine, 1967, 29, 676-682.

GSR was monitored during Rorschach testing. High GSR's were associated with (1) short reaction times, (2) initial responses to Cards I and VII and (3) the following categories of initial response: S, m, FK, cF, H, (H), and (A). GSR may be considered an index of the subject's anxiety level; the findings are explained in these terms. Relations of the GSR to sexual, religious and other content is also discussed.

257. Frankenhaeuser, M. Some aspects of research in physiological psychology. In L. Levi (Ed.), Emotional stress. New York: American Elsevier, 1967. Pp 16-26.

The stimuli used in studies of emotional stress, the stressors, vary both in kind and in intensity. The properties that these stimuli possess for a human subject vary greatly depending upon expectations. Expectations may be manipulated by instructions.

At least three main kinds of reactions are of interest in the study of emotional stress: physiological reactions, behavioral reactions, and subjective reactions.

258. Frankenhaeuser, M., Froberg, J., Hagdahl, R., Rissler, A., Bjorkvall, C., & Wolff, B. Physiological, behavioral, and subjective indices of habituation to psychological stress. Physiology and Behavior, 1967, 2, 229-237.

A habituation procedure was used to manipulate activation level in 15 subjects by exposing them repeatedly to a perceptual-conflict test. Performance in the test, subjective reactions, skin conductance, and catecholamine excretion were measured. The general characteristic of the data obtained was a progressive decrease in physiological and subjective indices of activation as performance improved. Special attention was paid to quantitative relations between the different variables in the course of habituation.

259. Frankenhaeuser, M., Froberg, J., & Mellis, I. Subjective and physiological reactions induced by electrical shocks of varying intensity. Neuroendocrinology, 1965/66, 1, 105-112.

Effects of alternating current of different intensities applied at irregular intervals to two fingers of one hand during five separate sessions were studied in 15 subjects. The intensities ranged between 2 and 8 times the individual sensation thresholds. In line with the assumptions made, increases in shock intensity were accompanied by increased unpleasantness (measured by the method of magnitude estimation), increased adrenaline excretion, and decreased tissue resistance. Furthermore, unpleasantness was a positively accelerated function of adrenaline excretion and tissue resistance.

260. Frankenhaeuser, M., Jarpe, G., Svan, H., & Wrangsjo, B. Psychophysiological reactions to two different placebo treatments. Scandinavian Journal of Psychology, 1963, 4, 245-250.

Reactions to a placebo introduced either as a depressant or as a stimulant drug were examined in 16 healthy female subjects. Comparisons between pre- and post-placebo measurements showed that the two treatments produced marked effects in opposite directions: (1) the 'depressant' placebo produced a statistically significant decrease in pulse rate, blood pressure, objective and subjective reaction speed, as well as significant effects on subjective mood in the expected directions, and (2) the 'stimulant' placebo produced opposite and significant changes in all variables. The subjective reactions were, on the whole, more pronounced than the effects on performance and physiological functions.

261. Frankenhaeuser, M., Post, B., Nordheden, B., & Sioeberg, H. Physiological and subjective reactions to different physical work loads. Perceptual and Motor Skills, 1969, 28, 343-349.

Catecholamine excretion, cardiovascular functions, and subjective effort were studied in 10 healthy male Ss in a control condition and in three experimental sessions in each of which 5 successive 6-min. tests of either 150, 450, or 750 kpm/min., were performed on a bicycle ergometer. Catecholamine-excretion rates remained close to control levels at the lower work loads, while the highest load induced a significant increase in both adrenaline and noradrenaline output. Heart rate, systolic pressure, and subjective effort increased consistently with increasing work load.

262. Frazier, T., Weil-Malherbe, H., & Lipscomb, H. S. Psychophysiology of conditioned emotional disturbances in humans. Psychophysiology, 1969, 5, 478-503.

A discriminative avoidance conditioning technique was used to study urinary excretion of selected adrenal hormones in response to a stimulus which had acquired conditioned noxious properties through association with availability of punishment. A four day test procedure was employed: (1) to habituate subjects to the test environment; (2) obtain control data; (3) condition subjects; and (4) test reactions to the conditioned noxious stimulus. Urine samples were taken at two-hour intervals preceding and following each of the four trials, and were analyzed for epinephrine, norepinephrine, total 17-hydroxycorticosteroids, and other urinary constituents. These results were correlated with results obtained from monitoring of heart rate, skin resistance, blood pressure, and three measures of panel monitoring performance. Data analyses revealed significant changes from control levels during the test period for each of the principal measures described above and some specification of life systems interrelationships through correlation and factor analyses. Factors were identified which related to behavioral efficiency, psychological effort, fluid transport regulation, cardiovascular-adrenal, and specific epinephrine and norepinephrine factors.

263. Freeman, G. L. Changes in tonus during completed and interrupted mental work. Journal of General Psychology, 1930, 4, 309-334.

Mental work involves an initial increase in muscular tension which decreases as the performance progresses towards completion. Experiments were conducted on 10 subjects and with tasks which utilized (a) a continuous unitary operation, (b) a discontinuous unitary operation, and (c) several alternative operations. Other experiments studied the effect of interruption on the tonus accompaniments of mental work. Twenty tasks (10 mental and 10 mental-muscular) were given to 10 subjects. Half of these tasks were interrupted one minute after they were begun. About 98% of the interrupted tasks were either continued during interruptive disturbance or resumed one minute after the interruption began. A comparison of the tonus change during equivalent periods of interrupted and uninterrupted mental work showed a regular and notable increase in tension during the periods of interruption. The results of this paper form the basis for the argument that the dynamics of completed and interrupted mental work may be understood in neurophysiological terms. Instead of the doctrine of "psychic tension" as proposed by Lewin to account for these facts, only such concepts have been utilized as competition, reinforcement, and inhibition. The suggestion is made that eventually all of Lewin's important research in the field of action may be reinterpreted in these or related neural terms.

264. Freund, K. Jednoduchy pristroj k mereni volumovych zmen muzskeho genitalu. (A simple device for measuring volume changes of the male genital.) Ceskoslovenska Psychiatrie, 1965, 61, 164-168.

A description of a device for measuring volume changes in an erotic preference test, i.e., S's reactions to pictures of nude men, women, and children of both sexes.

265. Fuhrer, M. J., & Baer, P. E. Cognitive processes in differential GSR conditioning: Effects of a masking task. The American Journal of Psychology, 1969, 82, 168-180.

Differential GSR conditioning was assessed in a group (N=43) which had the conditioning procedure embedded in a probability-learning task (Group M) and in a comparison group (N=24) which underwent a conventional differential-conditioning procedure (Group C). The CSs were 8-sec. tones of differing frequencies, the UCS was a shock, and the CS-UCS interval was 8 sec. Division of the CS-UCS and the post-UCS period into three 4-sec. intervals permitted the analysis of multiple GSRs. Content analyses of post-conditioning interviews indicated that 62% of the Ss in Group C verbalized the stimulus relations accurately, while only 30% of the Ss in Group M did so. As expected from a cognitive viewpoint, Group M showed significantly less conditional differentiation of GSRs in all three intervals. Significant GSR conditioning was observed in the three intervals for the 15 accurate verbalizers in Group C, but there was no evidence of conditioning in any interval for the 9 inaccurate verbalizers. The 13 accurate verbalizers in Group M showed significant second-interval differentiation while the 30 inaccurate verbalizers did not. However, both accurate and inaccurate verbalizers in Group M showed significant first-interval conditioning during the late acquisition trials.

266. Funkenstein, D. H., King, S. H., & Drolette, M. The direction of anger during a laboratory stress-inducing situation. Psychosomatic Medicine, 1954, 16, 404-413.

Blood pressure and ballistocardiograph measurements taken before, during, and after a "free" stress-inducing (solution of arithmetic problems, rote memory for digits) situations with 69 college Ss indicated, after statistical analysis, confirmation for 3 hypotheses stemming from the belief by Rado that the "physiological accompaniments of anger directed toward the self and of fear would be similar." Reactions (emotional) to the stress situation were determined by interview.

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267. Gaviria, B. Autonomic reaction magnitude and habituation to different voices. Psychosomatic Medicine, 1967, 29, 598-605.

This experiment studied habituation to and magnitude of electrodermal, plethysmographic, and heart rate changes in response to 4 auditory stimuli: (1) noise, (2) the subject's own voice, (3) the subject's spouse's voice, and (4) unknown person's voices. Although consistent interstimulus differences are small, habituation seems to be slowest to noise, next slowest to one's own voice and the spouse's voice, and fastest for unfamiliar voices. Interpersonal factors independent of the verbal message may be reflected in the pattern of autonomic reaction. However, an orienting reaction element seems to have been intense enough to obscure specific interstimulus response differences.

268. Geer, J. H. Fear and autonomic arousal. Journal of Abnormal Psychology, 1966, 71, 253-255.

Thirty-two female undergraduates were classified as high fear (HF) or low fear (LF) of spiders. After reduction of orienting responses to pictures of neutral animals, Ss in the experimental condition were shown pictures of a spider, and Ss in the control condition were shown pictures of a snake. Using the response to the last neutral stimulus as a baseline, HF Ss in the experimental condition when first shown a spider yielded greater GSRs than other groups. This increase in GSR responding for HF experimental Ss was, for 2 more trials, maintained relative to Ss in the control condition. HF Ss in the experimental condition also yielded GSRs of greater duration than all other groups when first shown the spider stimulus.

269. Geer, J. H. A test of the classical conditioning model of emotion: The use of nonpainful aversive stimuli as unconditioned stimuli in a conditioning procedure. Journal of Personality and Social Psychology, 1968, 10, 148-156.

A test of the classical conditioning model of human emotion was conducted using aversive but not painful stimuli. Forty-eight Ss, equally divided between the sexes, were assigned to groups that had either forward, backward, or random association between CSs (tones) and UCSs (color photos of victims of violent death). Results, using GSR as the dependent variable, indicated that when comparing forward with backward conditioning, the model held quite well. The condition of random association between CS and UCS produced the greatest effect; Ss were more reactive in that condition than in either the forward or backward condition. The data were interpreted to indicate that Ss were sensitive to the condition of random association between stimuli and that condition has powerful effects. Further, when the conditions for the conditioning model are met, the model appears to predict the outcome.

270. Geer, J. H., Davison, G. C., & Gatchel, R. J. Reduction of stress in humans through non-veridical perceived control of aversive stimulation. Journal of Personality and Social Psychology, in press.

In a reaction time (RT) task 40 subjects were told to react to the onset of a six sec. shock. Following 10 trials, half the subjects were told that by decreasing their RT they would reduce shock duration. Remaining subjects were simply told that shock duration would be reduced. All subjects, regardless of group assignment or RT, received three sec. shocks in the second half of the study. During the second half of the study, subjects who believed they had control showed fewer spontaneous skin conductance responses (SCRs) and smaller SCRs to shock onset than subjects who did not feel they had control. Results indicated that perception of effective control, even if not veridical, can affect autonomic responding. Discussion of related research and implications of the results are included.

271. Geer, J. H., & Klien, K. Effects of two independent stresses upon autonomic responding. Journal of Abnormal Psychology, 1969, 74, 237-241.

In an attempt to determine whether the GSR and cardiac response to "aversive" photographs contained both orienting and emotional components, 40 Ss were shown either photographs of dead bodies or photographs of live individuals projected upside down. In addition, half of the Ss expected, but never received, shocks. The data were interpreted to indicate that in addition to the orienting response, an emotional component was present in the response to the aversive photographs. The effect of shock threat was to increase reactivity to all stimuli. Analysis revealed that the GSR was most responsive to the content of the stimuli while the cardiac response was most sensitive to the shock threat.

272. Geldreich, E. W. Studies of the galvanic skin response as a deception indicator. Transactions Kansas Academy of Science, 1941, 44, 346-351.

Two experiments were conducted. In Experiment A the effect of deception upon the nascent galvanic skin response was investigated. The deceit situation consisted in the denial of a selected card by the subject. For fifty subjects, the percentage of success in deception detection for the experiment was seventy-four.

In Experiment B the effect of deception upon the fatigue-adapted G.S.R. was investigated. The G.S.R. was fatigue adapted to non-guilty cards. The deceit situation consisted in the denial of a selected card by the subject. One hundred percent success for deception diagnosis was obtained for the experiment with fifty persons serving as subjects.

The galvanic skin response may be used as a deception indicator, despite the responsiveness to extraneous sensory and ideational stimuli, if the deception technique is properly controlled. Attention must be concentrated. The deceit situation must be specific, never general.

The vitiating effect of extraneous sensory and ideational stimuli upon the G.S.R. as a deception indicator is obviated by fatigue-adapting the response to non-guilty stimuli. This condition of the response is highly diagnostic of deception..

273. Geldreich, E. W. Further studies of the use of the galvanic skin response as a deception indicator. Transactions Kansas Academy of Science, 1942, 45, 279-285.

The action of fear, induced by means of shock intimidation and suggestion upon a deception test when the G.S.R. is used as the deception indicator, was investigated. The deceit situation consisted in the denial of a selected card by the subject. A control and experimental deceit situation was used. In the experimental condition the subject was shocked, threatened with further shock, and advised of the efficacy of the apparatus as a "lie detector." Under the experimental condition of shock, greater success in detection of deceit was obtained. It may be concluded that the so-called "cold sweat" of excitement induced through fear or apprehension, as occurs under laboratory conditions, does not make ineffective the G.S.R. as a deception indicator; on the contrary, under the conditions herein described, it enhances the effectiveness of the response.

274. Gellhorn, E. Recent contributions to the physiology of the emotions. Psychiatric Research Report, 1960, 12, 209-223.

"The mecholyl test, the vascular reactions, and the urinary excretion in the state of anger suggest a state of high excitability of the hypothalamus and a dominant secretion of noradrenaline. The same indicators suggest a lesser hypothalamic excitability and a dominant secretion of adrenaline in the state of fear. The proprioceptive impulses which are increased in anger and reduced in fear have a decisive influence on hypothalamic excitability and may be a factor in the regulation of the hypothalamic downward and upward discharges, that determine the character of the emotions. The disposition of certain individuals to react to situations of stress with anger whereas others react with fear is explained on the basis of the interindividual variations in hypothalamic sympathetic excitability."

275. Gellhorn, E. The emotions and the ergotropic and trophotropic systems. Psychologische Forschung, 1970, 34, 48-94.

The characteristics of the ergotropic and trophotropic systems are described on the basis of stimulation and lesion experiments. The integration of autonomic and somatic processes is stressed. Muscle tone, hypothalamic and emotional excitability are positively correlated. Willing changes in muscle tone may therefore be used to control emotions.

The trophotropic rebound following strong ergotropic excitation represents a physiological mechanism for effectively terminating emotional excitement. It is difficult, however, to utilize this mechanism in social situations arousing emotions. The relation of attitude to the ergotropic and trophotropic systems is briefly discussed.

276. Gerard, H. B. Disagreement with others, their credibility, and experienced stress. Journal of Abnormal and Social Psychology, 1961, 62, 559-564.

In a setting where the subject was confronted with disagreement from three other subjects, we varied both the degree to which he was in disagreement with them and his relative ability to make the visual judgements in question. He was confronted with two series of nine judgments each and found himself in disagreement with the others on six of the nine trials. We determined, after each series, the internal consistency of his self-evaluation, his evaluation of the others, and the evaluation he guessed they had made of him. We also measured the stress the subject experienced as reflected by changes in his skin conductance. Where there was a clear differential in ability, the subject evidenced both a relative diminution of stress and greater relative consistency of self-other evaluation. This relationship held where he was in mild disagreement with the others. Where the disagreement was large, the greater his ability relative to the others the more stress did he experience and the less consistent were his self-other attitudes. An interpretation for this finding is offered.

277. Gerard, H. B. Physiological measurement in social psychological research. In P. H. Leiderman & D. Shapiro (Eds.), Psychobiological approaches to social behavior. Stanford: Stanford University Press, 1964. Pp. 43-58.

Growing dissatisfaction with total reliance upon the verbal reports of the subject, and a developing concern with intra-individual processes, has created increasing interest in physiological measures in social research in recent years. The author suggests that measurement of such physiological correlates of behavior as finger-pulse amplitude, EKG and GSR relieves the experimenter of relying completely upon the subject's phenomenology to determine the degree of success of the induction of an experimental variable.

278. Gerard, H. B. Choice difficulty, dissonance, and the decision sequence. Journal of Personality, 1967, 35, 91-108.

An experiment was run to examine some derivations from dissonance theory concerning inspection behavior before and after a decision, the postdecisional reevaluation of the choice alternatives, physiological arousal, and subsequent memory for the choice alternatives. S was confronted by a difficult decision (where the alternatives were close in value) or an easy one (where the alternatives were disparate in value). In general, the four kinds of data (inspection, reevaluation, arousal, and recall) supported the theory and also extended our knowledge of the decision-making process.

279. Gerard, H. B., & Greenbaum, C. W. Attitudes toward an agent of uncertainty reduction. Journal of Personality, 1962, 30, 485-495.

An experiment was run in which the S confronted repeated disagreement from two of three peers on a series of unambiguous stimuli. These two peers always preceded S in their stimulus judgements. The third peer always followed S. He either agreed with S on each judgement or, depending on the treatment condition, he began to agree with S only after a certain number of trials. Lateness of the "switch" to agreement was the systematically varied parameter. The results showed an increasing increment in confidence due to "4's" switch the later the switch occurred, with a greater accompanying physiological impact. A curvilinear relationship was found between the attitude toward the person who switched and the lateness of his switch. He was relatively more preferred when he switched either very early or very late in the series. Some implications and alternate interpretations of the findings were discussed.

280. Gerard, H. B., & Rabbie, J. M. Fear and social comparison. Journal of Abnormal and Social Psychology, 1961, 62, 586-592.

The present experiment was stimulated by some work by Schachter in which he applied Festinger's theory of social comparison to account for the arousal of affiliative tendencies when the individual is exposed to a threat. (Response to threat was measured by skin resistance, questionnaire and verbal responses.) We attempted to test directly the tenability of explaining the relationship between fear and affiliations by social comparison theory. According to the theory, the individual is motivated to compare with others some aspect of himself, e.g., an opinion he holds, an ability he possesses, or an emotional experience whenever other means of achieving certainty about that aspect are lacking. Using a modified version of Schachter's fear arousing situation, in which electric shock was threatened, we provided the individual with information as to the intensity of emotion experienced by three other individuals seated in adjacent cubicles. According to the theory this should reduce the desire for affiliation. Support was found for the theory. Other motives also appear to have been operative as well as strong sex differences in reaction to threat. The effect of sex appears to be linked with the order of birth in the family.

281. Germana, J. Central efferent processes and autonomic-behavioral integration. Psychophysiology, 1969, 6, 78-90.

Neurophysiological and psychophysiological studies have provided a substantial amount of data concerning the integration of autonomic and somatic responses. It is clear that this integration is primarily achieved within the central nervous system and that coordinated autonomic-behavioral activity is reflected, at the periphery, in the anticipatory and preparatory phases of movement. It is suggested that the central efferent organization of these preparatory responses is directly responsible for emotional experience. The demonstration that autonomic events are highly correlated with behavioral responses is regarded as providing further support for the view that the primary concern of the central nervous system is the production of adaptive behavior.

282. Gibby, R. G., Sr., Gibby, R. G., Jr., & Townsend, J. C. Effect of stress upon rate of change of heart-beat rate. Perceptual and Motor Skills, 1969, 29, 463-466.

The purpose of the study was to determine the stability of the rate of change of heart rate (instantaneous heart rate) from non-stress to stress conditions. Ss were 80 white male science or engineering majors, all free from emotional or physical disorders. They were subjected to psychological and physiological stress, and all were required to show an increase from pre-stress to post-stress conditions in both subjective and physiological indexes of stress. Pre- and post-stress rate of change of heart-rate scores were compared. The difference between the mean scores was not significant ($p < .10$). The correlation between pre- and post-test rate of change was .64. It was concluded that the rate of change of heart-rate is a stable parameter.

283. Gittleman, B., Shatin, L., Bierenbaum, M. L., Fleischman, A. I., & Hayton, T. Effects of quantified stressful stimuli on blood lipids in man. The Journal of Nervous and Mental Disease, 1968, 147, 196-201.

The effect of carefully measured, reproducible stimuli upon blood pressure, pulse and blood lipids of 10 normal volunteers has been studied. Each subject was present for five sessions in which stimuli applied to the subject were venipuncture, electrical shock, squeezing of a hand dynamometer, mirror drawing and a psychologically stressful interview. Blood pressure, pulse and blood lipids (plasma free fatty acids, serum cholesterol, triglycerides, phospholipids and total lipids) were determined before and at periodic intervals after the application of the various stimuli. It was noted that there was an apparent rise in the free fatty acids with all stimuli at either the 15- or 30-minute interval. A less marked but similar effect was noted with the triglyceride levels. There were no significant deviations from expected values for the other blood lipids after any of the stimuli used. These results raise certain questions as to the significance of low level, day-to-day stresses on blood lipids, and the pathogenesis of atherosclerotic heart disease.

284. Glass, D. C., & Mayhew, P. The effects of cognitive processes on skin conductance reactivity to an aversive film. Psychonomic Science, 1969, 15, 72-74.

Two experiments tested the proposition derived from the theory of cognitive dissonance that attenuation in skin conductance response to a stressor film would be greatest where the individual voluntarily commits himself to watching the film, and makes the discrepant commitment under conditions of low rather than high justification. Experiment 1 showed that skin conductance was indeed less in the dissonance conditions than in a no-dissonance control condition, and Experiment 2 provided partial replication of these results. In both studies, however, the justification manipulation failed to exert a differential impact on skin conductance.

285. Glickstein, M., Chevalier, J. A., Korchin, S. J., Basowitz, H., Sabshin, M., Hamburg, D. A., & Grinker, R. R. Temporal heart-rate patterns in anxious patients. AMA Archives of Neurology and Psychiatry, 1957, 78, 101-106.

"In a multidisciplinary study of anxiety, heart rate was measured continuously during a series of discrete periods on 3 successive experimental days. These periods were defined by a series of test procedures administered before and after a psychiatric stress interview. Heart rate was averaged over the 3 days for each of the periods. Intercorrelating subjects yielded 2 relatively independent clusters of temporal heart-rate patterns. These groups of Ss (A, disturbed and markedly anxious; B, less anxious, less disturbed) also differed significantly in personality and affective response and seemed to represent distinct modes of cardiovascular response in a psychological stress situation." These and other results are discussed in relation to the use of the multidisciplinary approach in the establishment of psychophysiological relations in the study of anxiety.

286. Goldstein, I. B. Role of muscle tension in personality theory. Psychological Bulletin, 1964, 61, 413-425.

In spite of the frequent lack of comparability of studies, it is still possible to draw some generalizations and to perceive the emergence of certain trends. To begin with, distinct differences in tension level exist between individuals and tend to be maintained under many situations. There are also suggestions that muscle tension relates to a variety of traits, although the relationship is not always clear-cut. The common factor amongst these traits appears to be a general tendency to be extremely responsive to most stimuli. Accompanying the high muscle tension would be the tendency to act out and express emotion freely (i.e., to be more irritable, impulsive, energetic, active, excitable).

287. Goldstein, I. B., Grinker, R. R., Sr., Heath, H. A., Oken, D., & Shipman, W. G. Study in psychophysiology of muscle tension: I. Response specificity. Archives of General Psychiatry, 1964, 11, 322-330.

In 15 psychiatric patients with depression as a major symptom recordings were made of heart rate, systolic blood pressure, diastolic blood pressure, overall body movement, and muscle action potentials in seven widely separated muscles. The procedure was repeated on four different sessions. By means of interviews, affect was stimulated in Session 1, self-control in Session 2, and the neutral discussion conducted in Session 3. During the fourth session the subject remained in a quiet, resting state. Psychiatric ratings showed that the three interview sessions were quite different from one another.

It was found that an individual tended to respond to various stimuli consistently with his maximal level of response in the same muscle (response specificity), and that he maintained a consistent hierarchy or pattern of muscle tension (response stereotypy). When the effects of basal level (Session 4) were removed and change scores utilized, both of these principles were still applicable.

288. Goldstein, M. J., Jones, R. B., Clemens, T. L., Flagg, G. W., & Alexander, F. G. Coping style as a factor in psychophysiological response to a tension-arousing film. Journal of Personality and Social Psychology, 1965, 1, 290-302.

Three groups of Ss, selected on the basis of perceptual defense patterns (avoiders, sensitizers, and nonspecific defenders--NSD) were exposed twice to a tension-arousing film (Wages of Fear) at 1-wk. intervals. Continuous recording of 4 psychophysiological variables was done throughout both film viewings. On initial showing, the avoider and sensitizer groups showed markedly less skin-conductance response than the NSD group. No differences were found on the other psychophysiological variables on initial showing. On the 2nd showing avoiders and sensitizers reacted more intensely in skin conductance than they did initially while the NSD group showed a marked attenuation in skin-conductance response on the 2nd viewing. The data for heart rate did not parallel the skin-conductance data as the avoider group showed less heart-rate response on 2nd showing while the NSD group showed greater heart-rate reactivity. When the groups with clear defensive patterns (avoiders and sensitizers) were separated into high-and low-anxiety groups, interactions between coping style and anxiety level were noted on finger pulse volume but not for skin conductance. The question of patterning of response to threat and its relationship to optimum psychological functioning is discussed.

289. Goldstein, M. L. Physiological theories of emotion: A critical historical review from the standpoint of behavior theory. Psychological Bulletin, 1968, 69, 23-40.

Several major theoretical approaches to the area of emotion are reviewed and compared by means of a series of diagrams. The concept of emotion, as used by physiological theorists such as William James, Cannon, Lindsley, and Hebb, and neobehaviorists such as Brown & Farber, Neal Miller, and Mowrer, is subjected to a critical evaluation from the standpoint of behavior theory. It is concluded that certain confusions persisting in this area of research arise from the use of poorly defined concepts and the scarcity of rigorously defined experimental techniques. Miller's work is selected as an example of the kind of reductionism that is possible within this area. Arnold's theory which deals with the concept of an emotional attitude is also discussed.

290. Golin, E., & Lyerly, S. B. The galvanic skin response as a test of advertising impact. Journal of Applied Psychology, 1950, 34, 440-443.

The desirability of a method for selecting the most effective advertisement from a group of preliminary layouts is recognized by advertisers, and recently some use has been made of the galvanic skin response (GSR) for this purpose. A factorial experiment was designed using the GSR in an attempt to differentiate the reaction-producing characteristics of layouts. Twelve ads were used comprising four layouts for each of three products. The GSR responses of sixty male subjects to these advertisements revealed significant differences among layout styles and among subjects, but no significant differences among the three products. All first-order interactions of products, layouts, and subjects were significant.

The results of the study demonstrate that the GSR is sensitive to differences in layouts and that further research may lead to the development of practical techniques for testing the effectiveness of advertising copy before the costly publication stage is reached. The study also serves to illustrate the importance of careful planning and design of GSR research including the use of proper experimental control and efficient statistical methods.

291. Gonik, U., & Blumberg, S. Psychophysiological correlates of personality test variables and some properties of auditory stimuli. Texas Reports on Biology & Medicine, 1963, 21, 198-206.

Psychophysiological reactivity in heart rate and skin resistance was studied as a function of some stimulus and organism properties. Significantly greater reactivity to intellectual tasks as opposed to passive reception of sounds was found, regardless of differences in anxiety level and psychological defensiveness of the subjects. Within a group of relatively low anxious, normal subjects, the five most anxious were more reactive than the five least anxious to both the intellectual tasks and the sounds. Evidence of ANS fractionation was obtained. The need for defining and scoring the relevant dimensions of the stimulus, organism, and response variables in the context of their interaction was discussed. Investigation of such dimensions necessarily precedes the establishment of meaningful relationships between personality variables and psychophysiological reactions.

292. Goodell, H., Graham, D. T., & Wolff, H. G. Changes in body heat regulation associated with varying life situations and emotional states. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 418-432.

1. Rectal temperatures were measured at minute intervals before, during and after a standard ten minute burden of work, in three healthy adults, two men and one woman.

2. The life situations and feeling states of the subjects were recorded at the end of each observation.

3. The time required for temperature to return to the resting level before work, or the area under the curve defined by the rise of body temperature caused by the work and its subsequent return to the resting level was considered a measure of thermal adaptation.

4. In the three subjects, thermal adaptation to a uniform burden of work was strikingly slower in periods of life stress associated with feelings of hostility, tension, and of being pushed or "driven", than it was on "good days" when such feelings were minimal or absent.

293. Gottlieb, A. A., Gleser, G. C., & Gottschalk, L. A. Verbal and physiological responses to hypnotic suggestion of attitudes. Psychosomatic Medicine, 1967, 29, 172-183.

The effects of the hypnotic suggestion of the "hives" and "Raynaud's" attitudes on the skin temperature, blood pressure, and pulse rate of twelve 16- to 17-year-old boys were investigated. The two attitudes (the former consisting of a feeling of being mistreated, but with a desire only to ruminate about it; the latter--"Raynaud's" a feeling of being mistreated, with a wish to strike the mistreater) elicited different physiological changes in these modalities, and these differences reached significance when the attitudes were directed toward a research assistant but not when directed toward the hypnotist himself. The "hives" attitude produced increases in skin temperature, but the "Raynaud's" attitude did not. The "Raynaud's" attitude produced significant increases in heart rate and systolic but not diastolic blood pressure; the "hives" attitude resulted in no significant changes in these variables.

Anxiety and hostility levels, as assessed by the Gottschalk-Gleser method, were elevated when these young males were put into the hypnotic state, the increase in the anxiety level reaching statistical significance. Furthermore, a significant negative correlation was found between anxiety scores and skin temperature change measured from before to after each verbal sample.

294. Gottschalk, L. A. Psychologic conflict and electroencephalographic patterns. A.M.A. Archives of Neurology and Psychiatry, 1955, 73, 656-662.

The extent to which certain psychologic activities and processes can modify electroencephalographic abnormalities of the kind seen in epilepsy was studied in four male epileptics between the ages of 20 to 35.

In one epileptic patient, studied intensively, the spontaneous expression of specific emotional states--the wish for acceptance and love from an authority figure and a strong fear of repudiation--was regularly followed within 30 seconds by slow-wave, high-voltage activity. In this patient, the verbal expression of such emotionally charged ideas seemed to counteract the otherwise suppressing effect of speaking on such slow wave electroencephalographic activity.

295. Gottschalk, L. A. Phasic circulating biochemical reflections of transient mental content. In A. J. Mandell (Ed.), Methods and theory in psychochemical research in man. New York: Academic Press, 1969. Pp. 357-378.

This study used a content analysis technique to measure such psychological dimensions as hostility and anxiety. The steps involved in developing such a scale are briefly described. Data are presented detailing the relation between the scale and such biochemical elements as free fatty acids, hormone levels and 17-hydroxycorticosteroids. Subject populations include: nonpsychotic male medical patients, college athletes, normal females, and chronic schizophrenic patients.

296. Gottschalk, L. A., Criegorn, J. M., Gleser, G. C., & Iacono, J. M. Studies of relationships of emotions to plasma lipids. Psychosomatic Medicine, 1965, 27, 102-111.

A natural history study disclosed different relationships between several types of emotions and blood lipids in a group of 24 men. Findings were cross-validated in a study of a second group of 20 men. Anxiety scores had a significant positive correlation with plasma FFA in both groups, whereas three types of hostility indexes had essentially zero correlation. More anxious men tended to have higher FFA levels and sharper rises in FFA than nonanxious men in reaction to venipuncture and free associating for 5 min. There was evidence for positive correlations between triglyceride levels and both anxiety and hostility inward scores as well as for total hostility outward scores and levels of blood cholesterol. In contrast to other studies where higher levels of emotional arousal have often been involved and no differential relationship has been found between blood lipid levels and the kind of emotions, in this study plasma lipid levels were found differently related to anxiety and hostility at relatively low levels of acute arousal.

297. Gottschalk, L. A., Gleser, G. C., D'Zmura, T., & Hanenson, I. B. Some psychophysiological relations in hypertensive women. Psychosomatic Medicine, 1964, 26, 610-617.

In an experimental study of the pathological psychophysiology of essential hypertension, measurement of anxiety and hostility levels of 12 hypertensive women were observed over two 3-week periods; during these time periods the women received either hydrochlorothiazide (25-50 mg.) or a placebo.

Significant positive correlations occurred between hostility inward levels and average systolic and diastolic blood pressures. Significant negative correlations occurred between hostility outward levels and blood pressure. These and other significant psychophysiological correlations disappeared completely when the subjects were taking hydrochlorothiazide. Furthermore no significant changes in anxiety or hostility levels occurred while the women were taking hydrochlorothiazide, even though there were significant decreases in blood pressure during this time.

298. Grace, W. J. Life situations, emotions and chronic ulcerative colitis. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 679-691.

1) In these fistulous subjects the colon was found to participate in reactions to stressful life situations. Although in all of the four subjects colonic functions were of the same order, the two subjects who had ulcerative colitis were found to display more frequent and more sustained changes in colonic function than did the other subjects whose colons were free of such diseases.

2) Overwhelming life situations provocative of abject fear and dejection were associated with hypofunction of most of the large intestine with pallor, relaxation, lack of contractile activity and relatively low concentrations of lysozyme in the colonic secretions.

3) Life situations provocative of conflict with feelings of anger, resentment and hostility or of anxiety and apprehension were found to be associated with hyperfunction of the colon, manifested by increased rhythmic contractile activity and ultimately by intense and frequent waves in the cecum and ascending colon and replacement of rhythmic activity on the left by sustained contraction of longitudinal muscles with shortening and narrowing of the colonic lumen, and hypersecretion of the enzyme lysozyme.

299. Grace, W. J. Life stress and regional enteritis. Gastroenterology, 1953, 23, 542-553.

Four patients with proven regional enteritis were studied. In each the onset of the illness and each exacerbation coincided with periods of stressful life situations. The patients reacted to the stressful situations with an attitude characterized by feelings of "getting it over with" or "getting rid of it."

300. Grace, W. J. Life stress and chronic ulcerative colitis. Annals of the New York Academy of Sciences, 1954, 58, 389-397.

(1) Feeling states, characterized by anger and resentment, are associated with hyperfunction of the colon. This hyperfunction of the colon is manifested by hyperemia, engorgement, hypermotility, hypersecretion of mucus, and of the enzyme lysozyme.

(2) Hyperfunction of the colon results in increased fragility of the colonic mucosa.

(3) The colon, during periods of anger and resentment, resembles the colon after the administration of mecolyl.

(4) Sustained feelings of anger and resentment associated with sustained hyperfunction of the colon result in submucosal bleeding and ulceration.

301. Grace, W. J., & Graham, D. T. Relationship of specific attitudes and emotions to certain bodily diseases. Psychosomatic Medicine, 1952, 14, 243-251.

1. One hundred and twenty-eight patients, who had one or more of the following symptoms or diseases as responses to life situations, were studied: urticaria, eczema, cold hands, vasomotor rhinitis and asthma, diarrhea, constipation, nausea and vomiting duodenal ulcer, migraine, arterial hypertension, low back pain.

2. It was found that each of these conditions was associated with a particular, completely conscious, attitude toward the precipitating situation. There were, in other words, physiological changes specific to each attitude.

3. These changes are biologically appropriate to the attitudes they accompany.

4. It is proposed that "emotion" be defined to mean "an attitude with its associated physiological changes."

302. Grace, W. J., Holman, C. W., Wolf, S., & Wolff, H. G. The effect of vagotomy on the human colon. Gastroenterology, 1949, 13, 536-546.

On days of anger, resentment and hostility, lysozyme concentration of 62, 62.5, and 83 units per cc. were found, while on days of relative calm, security, relaxation and good spirits, values of 11.4, 10.3, and 19 units per cc. were obtained.

303. Grace, W. J., Seton, P. H., Wolf, S., & Wolff, H. G. Changes in lysozyme formation in the human colon in various emotional states. Bulletin of the New York Academy of Medicine, 1949, 24, 390-391.

This article reviews data which suggests that lysozyme count may be related to such states as resentment, hostility, tension, etc.

304. Grace, W. J., Seton, P. H., Wolf, S., & Wolff, H. G. Studies of the human colon: I. Variations in concentration of lysozyme with life situation and emotional state. American Journal of the Medical Sciences, 1949, 217, 241-251.

The concentration of the mucolytic enzyme, lysozyme, has been measured in the stools of normal subjects and subjects with mucous and ulcerative colitis under a variety of circumstances and associated with widely varying life situations, emotions and attitudes. It was found that among normal subjects and subjects with diarrhea without ulceration, transitory elevations of lysozyme often occur in company with general reactions of humiliation with anxiety, resentment and guilt. Among subjects with ulcerative colitis, on the other hand, marked and sustained elevations of lysozyme were observed in such situations. These periods were characteristically marked by feelings of intense anger and hostility which were unexpressed and repressed with varying degrees of completeness, so that the subject displayed an exterior of relative calm and "sweetness". Such elevated values for lysozyme in the stool contrasted with relatively normal values in the same subjects during periods of satisfaction and contentment.

305. Grace, W. J., Wolf, S., & Wolff, H. G. Life situations, emotions and chronic ulcerative colitis. Journal of the American Medical Association, 1950, 142, 1044-1048.
1. Feeling states characterized by anger and resentment are associated with hyperfunction of the colon. This hyperfunction of the colon is manifested by hyperemia, engorgement, hypermotility, hypersecretion of mucus and of the enzyme lysozyme.
 2. The colon during periods of anger and resentment resembles the colon after the administration of methacholine chloride.
 3. Sustained feelings of anger and resentment associated with sustained hyperfunction of the colon result in submucosal bleeding and ulceration.
306. Grace, W. J., Wolf, S., & Wolff, H. G. Life situations, emotions and colonic function. Gastroenterology, 1950, 14, 93-108.
1. In two fistulous subjects the colon was found to participate in reactions to stressful situations.
 2. Overwhelming situations provocative of abject fear and dejection were associated with hypofunction of the large intestine with pallor, relaxation, lack of contractile activity and relatively low concentration of lysozyme in the colonic secretion.
 3. Stressful life situations provocative of conflict, anger, resentment and hostility or anxiety and apprehension were found to be associated with hyperfunction of the colon manifested by hyperemia, hypermotility and increased secretion of the enzyme, lysozyme. Although in the two the changes in colonic function were of the same order, one subject, who had ulcerative colitis, was found to display more frequent and sustained changes in colonic function than did the other subject, whose colon was apparently free of disease.
307. Graham, D. T. The pathogenesis of hives: Experimental study of life situations, emotions, and cutaneous vascular reactions. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 987-1009.
1. Thirty unselected cases of chronic urticaria were investigated to determine the relationship between stressful life situations and the cutaneous processes responsible for the disease.
 2. Attacks of urticaria were highly correlated with emotional disturbances of a particular kind. There was no relation discovered between exposure to allergens and attacks.
 3. Traumatic life situations responsible for attacks were almost exclusively those in which the patient developed resentment because he saw himself as the victim of unjust treatment which he could do nothing about.
 4. Experimental study of cutaneous vascular reactions indicated that the disease was the result of extreme dilatation of both arterioles and minute vessels in the skin occurring as part of the patients' reactions to such situations. These are the same changes as occur following actual trauma to the skin.

308. Graham, D. T. Cutaneous vascular reactions in Raynaud's disease and in states of hostility, anxiety, and depression. Psychosomatic Medicine, 1955, 17, 200-207.

1. Observations of changes in the minute vessels (capillaries and venules) and arterioles of the forearm skin were made in 19 patients with various diseases at times of experimentally induced emotional disturbances.

2. An attitude of hostility (a wish to take directly aggressive action) was associated with constriction of arterioles and increased tone of minute vessels.

3. Such hostility was found to be an invariable accompaniment of major attacks of Raynaud's disease in the 4 women with that condition who were studied. The Raynaud phenomenon itself consists of constriction of both arterioles and minute vessels. It is suggested that these changes occur in the skin generally, and not only in the extremities.

4. An attitude of anxiety (anticipation of some harmful occurrence, combined with an urge to take action of some kind) was also associated with constriction of arterioles and increased tone of minute vessels.

5. States of "depression" were associated with constriction of arterioles and decreased tone of minute vessels.

6. The same person developed different emotional states, including different vascular changes, at different times.

309. Graham, D. T., Kabler, J. D., & Graham, F. K. Physiological response to the suggestion of attitudes specific for hives and hypertension. Psychosomatic Medicine, 1962, 24, 159-16

A specificity-of-attitude hypothesis for psychosomatic disease was tested experimentally by means of hypnotic suggestion of attitudes. Twenty healthy male subjects were given two attitude suggestions on each of 2 days, with the order of presentation reversed on the second day. The two attitudes employed were those associated with hives (the subject felt that he was being unjustly treated and could think of nothing he wanted to do about it), and hypertension (he had to be on guard against bodily assault). It was predicted that skin temperatures would rise more with the hives suggestion than with that for hypertension and that diastolic blood pressure would rise more with the hypertension than with the hives suggestion. Systolic blood pressure, respiratory rate, and pulse rate were also measured. No predictions of differential effects of the two attitudes on these variables were made.

The predictions were confirmed. Mean change, maximal rise, and rate of change of skin temperature during the hives suggestion were significantly greater than the corresponding changes during the hypertension suggestion. All three measures of change in diastolic blood pressure were significantly greater during the hypertension than during the hives suggestion. There were no differential effects of the two attitude suggestions on systolic blood pressure, heart rate, or respiratory rate.

310. Graham, D. T., Stern, J. A., & Winokur, G. Experimental investigation of the specificity of attitude hypothesis in psychosomatic disease. Psychosomatic Medicine, 1958, 20, 447-457.

The hypothesis states "that there is a specific relation between the attitude a patient develops toward the life situation disturbing him and the symptoms he develops in response to it." An experimental test is provided by suggesting certain attitudes to normal Ss along with measurement of skin temperature changes. Hypnotized Ss were told to assume the desired attitudes previously found associated with hives (rise in skin temperature) and with Raynaud's disease (fall in skin temperature). "The difference between the temperature responses to the 2 suggestions was statistically significant." The results, in general, were in conformity with the predictions. These and other findings are discussed with reference to experimental and statistical methods.

311. Graham, D. T., Stern, J. A., & Winokur, G. The concept of a different specific set of physiological changes in each emotion. Psychiatric Research Report, 1960, 12, 8-15.

The results of the investigation tend to support the hypothesis that the physiological changes associated with an attitude are specific for that attitude and are not associated with any other attitudes. Therefore they increase the likelihood that it is useful to define emotions as we have done--that is, as the combination of attitude plus physiological changes. It is then possible to say that the findings support the view that there is a specific set of physiological changes in each emotion, and that emotions can be differentiated in terms of their bodily expressions.

312. Graham, D. T., & Wolf, S. The relation of eczema to attitude and to vascular reactions of the human skin. Journal of Laboratory and Clinical Medicine, 1953, 42, 238-254.

1. Thirty-one patients with eczema were studied to determine the nature of the relation between stressful life situations and exacerbations of the disease, and to investigate the cutaneous processes responsible for the lesions.

2. Exacerbations of eczema occurred in response to situations in which the patient felt that he was prevented from doing as he wished, and was unable even to think of a way to deal with the frustrating circumstances.

3. Experimental study indicated that dilatation of the arterioles and minute vessels of the skin was an important step in the pathogenesis of the disease.

4. This vasodilatation was associated with increased itching.

5. It is suggested that the actual lesions are the result of scratching skin which is the site of vasodilatation. The evidence indicates that persons with eczema, because they are likely to feel guilty and to have urges toward dealing with their environments, often scratch to an extent out of proportion to the degree of itching.

313. Graham, F. K., & Kunish, N. O. Physiological responses of un hypnotized subjects to attitude suggestions. Psychosomatic Medicine, 1965, 27, 317-329.

Two attitude suggestions were made to un hypnotized subjects in an attempt to produce physiological changes similar to those obtained previously with hypnotized subjects. The suggestions were statements of attitudes found clinically to be associated with hives and with essential hypertension. Under hypnosis, the suggestions had produced specific and appropriate physiological changes. In a replication experiment, normal un hypnotized subjects did not show the same differential responses as hypnotized subjects although they showed as much physiological responsiveness over-all. When procedures were modified in a second experiment to elicit greater involvement of subjects, the response was more similar to that of hypnotized subjects. Rating scales indicated that subjects interpreted the suggestions correctly and were equally but only mildly aroused by them. An additional finding was that subjects who volunteered for a hypnosis experiment but were given waking suggestions did not differ from those who volunteered for a waking experiment.

314. Greenfield, N. S., Alexander, A. A., & Roessler, R. Ego strength and physiological responsivity: II. The relationship of the Barron Ego Strength Scale to the temporal and recovery characteristics of skin resistance, finger blood volume, heart rate, and muscle potential responses to sound. Archives of General Psychiatry, 1963, 9, 129-141.

No group differences were found on the latency score, on the time to peak magnitude for heart rate and muscle potential, and on recovery scores of the heart rate and finger blood volume measures. On the other measures, some differences between Es-groups were observed.

315. Greenwald, D. U. Some individual differences in electrodermal response to continuous affective stimulation. Psychological Monographs, 1936, 48 (2, Whole No. 148).

Two sequences of motion picture films were used as stimuli in this investigation of individual differences in the psychogalvanic response. As a single measure of individual records the author has devised the "dermal response quotient," which is found by dividing the number of responses by their mean value. This measure has a high reliability when the responses to the first part of the film are compared with those of the second. The variability of the female group was consistently greater than that of the male group. By means of introspective reports a close relationship was found between affective processes and the psychogalvanic response.

316. Grim, P. F., Kohlberg, L., & White, S. H. Some relationships between conscience and attentional processes. Journal of Personality and Social Psychology, 1968, 8, 239-252.

Twenty-two 1st-grade and 22 6th-grade children were administered measures of attention based on reaction time (RT) task involving varying preparatory intervals with associated GSR measures, and experimental and teacher-rating measures of resistance to temptation (RTT) to cheating. In both groups significant correlations were found between good performance on attention measures and RTT. The highest correlation ($r's = .61, .59$) was between high variability (SD) of RT and high cheating. Orthogonally rotated factor analyses indicated 3 similar factors at each grade. The 1st factor, task conformity, included psychomotor efficiency and teacher RTT rating variables. The 2nd factor, inner stability, included experimental RTT and psychomotor stability variables. The 3rd factor, restlessness, included nonspecific GSR and RTT rating variables. It is noteworthy that attention (psychomotor) and moral variables loaded on each factor rather than being separated by the factor analysis. The relations of the psychomotor to the moral variables at the 2 ages seemed to depend on the age developmental course of the former, relations being best when the variables represented attention rather than maturation of psychomotor skill. An ego-strength rather than a superego-strength interpretation of moral behavior is advanced to fit the findings. It is suggested that moral temptation distractors from task performance are psychologically related to the ordinary distractors of task performance. The interpretation advanced is James' notion that, "The essential achievement of will is to attend to a difficult object....."

317. Grimak, L. P., & Ponomarenko, V. A. Tipy vegetativnykh sdvigo v cheloveka pri emosional' nom napryazhenii. Types of autonomic shifts in man under emotional stress. Zhurnal Vysshei Nervnoi Deyatel' nosti, 1967, 17, 408-412.

Studied the reactions of the cardiovascular and respiratory systems, induced by marked negative emotions in 37 19-21 yr. old beginning parachutists under hypnotic reproduction of the circumstances of a jump, and 6 highly qualified air pilots in cases of real loss of automatic control and the threat of an emergency situation. Three types of physiological reactions of the cardiovascular and respiratory systems to stress situations are disclosed: hyper-, normo-, and hypotonic. The 3 types are related to the types of higher nervous activity of the Ss and to their preparedness for their job.

318. Grings, W. W., & Lockhart, R. A. Effects of "anxiety-lessening" instructions and differential set development on the extinction of GSR. Journal of Experimental Psychology, 1963, 66, 292-299.

Results of previous investigators indicate a failure of "anxiety-lessening" instructions to extinguish a GSR conditioned under long (e.g., 6 sec.) CS-UCS interval conditions. This study observed the effects of such instruction on GSR extinction under conditions varying UCS intensity and number of reinforcements. Results: (a) GSR extinguished more rapidly and to a greater extent under conditions of anxiety-lessening instructions than under conditions of noninstruction, (b) the instruction effect was independent of number of reinforcements and UCS intensity, (c) increasing GSR magnitude was observed during extinction in Ss previously giving large disparity responses--even when administered anxiety-lessening instruction--emphasizing the importance of assessing S's reaction to changed conditions as a determiner of subsequent responding.

319. Grossberg, J. M., & Wilson, H. K. Physiological changes accompanying the visualization of fearful and neutral situations. Journal of Personality and Social Psychology, 1968, 10, 124-133.

To test an assumption of Wolpe's systematic desensitization therapy that imagining fearful scenes produces physiological arousal, 18 high-anxiety and 18 low-anxiety girls were 1st read and then told to imagine a fearful and neutral scene 4 times. Heart rate (HR), skin conductance (SC), and forehead EMG were recorded during reading and imagining. For HR and SC (a) there were no significant differences between high-anxiety and low-anxiety Ss, (b) during reading there were no significant differences between fearful and neutral scenes, (c) during imagining fearful scenes produced significantly more arousal, (d) both measures declined significantly over trials. EMG failed to differentiate fearful and neutral scenes, but low-anxiety Ss showed significantly more EMG than high-anxiety Ss. To assess possible bias in scene presentation, 10 matched control Ss, neutral to both fearful and neutral scenes, were presented tapes of the experimental group's procedure. Persistence of significant HR and SC differences for fearful vs. neutral scenes suggested a confounding of extraneous factors with self-rated fear in producing greater arousal during fearful scenes.

320. Groves, A. B. Effects of laughter elicited to frustrating stimuli in children. (Doctoral dissertation, Illinois Institute of Technology) Ann Arbor, Mich.: University Microfilms, 1968. No. 68-14, 534.

Twenty-four children, twelve female and twelve male, between the ages of seven and twelve years, were assigned to an experimental and a control group for the purpose of studying how laughter in response to frustrating stimuli affects the physiological measures of heart rate and respiration rate. Each group was made up of six males and six females.

Specific hypotheses were:

1. The systematic presentation of a frustrating stimulus immediately followed by a laughter-provoking stimulus will significantly change the frustration response initially elicited and appropriately reinforced as seen in heart and respiration rates.

Corollary. These changes resulting during reinforced trials will be in the direction of responses produced by laughter alone and away from the responses produced by frustration alone.

Hypothesis 1 and its corollary were supported.

2. Following a series of reinforced laughter responses to frustrating stimuli, the presentation of a frustration stimulus alone will result in laughter responses.

Corollary. These nonreinforced laughter responses will be more similar to the initial laugh response rather than similar to the initial frustration response.

Hypothesis 2 and its corollary received partial support in that the respiration change was not significantly different from the initial laugh response, while the heart rate was.

The results also demonstrated that the organism responded to the experimental situation as a whole. Not merely those who laughed overtly during nonreinforcement trials but also those who did not laugh overtly showed responses similar to the initial laugh response and different from the controls who underwent frustration without laughing.

321. Guertin, W. H., & Wilhelm, P. L. A statistical analysis of the electrodermal response employed in lie detection. Journal of General Psychology, 1954, 51, 153-160.

"The lie detector examiner, using solely the Electrodermal Response phenomenon as his instrumental means of determining whether or not his subject attempts deception on the lie detector test, can make use of the present statistical analysis to supplement his empirical knowledge. With such addition he can become more proficient in the use of his equipment by placing more or less emphasis on deception criteria according to their statistical importance as is indicated in this similar work."

322. Guinan, J. F. An investigation on the relationship between pupil size and emotional words. (Doctoral dissertation, Michigan State University) Ann Arbor, Michigan: University Microfilms, 1966. No. 66-14,128.

The hypothesis of the present study was that presentation of emotional words would result in significantly different pupil reactivity (constriction or dilation) than would presentation of neutral words to the same subject. The words utilized were selected from published lists of words which were shown to affect behavior as measured by GSR and the Semantic Differential, and presented to a group of students. The three words with the highest and lowest "emotionality scores" were then chosen. Twenty-eight Ss were presented each of the three emotional and three neutral words for five seconds while motion picture recordings were being taken of their pupils.

It was found that overall mean pupil size of 27 out of 28 Ss was larger to emotional than to neutral words. Analysis of variance demonstrated that emotionality did have a significant effect on pupil size, and that there was also a significant interaction effect of emotionality and time (intervals). When the data for the first and last 2.5 seconds were analyzed separately, results showed that pupillary size during the first 2.5 seconds was not significantly different for emotional than neutral words. However, during the second 2.5 seconds of stimulus presentation the results clearly demonstrated that: pupil size was significantly larger to emotional than to neutral words.

323. Gullickson, G. R., & Darrow, C. W. The rapidity of EEG time changes during mental function. Electroencephalography and Clinical Neurophysiology, 1968, 24, 281. (Abstract)

There is an increase in rapid reversal of time relationships or "intersociative" activity, suggestive of reverberation between areas, during orienting and semantic processes. This is particularly noticeable in the comparison of the effects of unfamiliar with familiar stimuli. Such rapid phase changes are also increased following presentation of taboo as compared with indifferent verbal stimuli. Likewise, such an increase is seen during the preliminary latent period preceding ideationally induced galvanic skin responses. Furthermore, this activity characterizes the period of "expectancy" associated with the "contingent negative variation" in EEG polarity, and attends the acquisition of anticipatory responses to regularly repeated stimuli.

324. Gustafson, L. A., & Orne, M. T. Effects of heightened motivation on the detection of deception. Journal of Applied Psychology, 1963, 47, 408-411.

One of 5 cards was selected by each S and 2 minutes association to this card was required. GSR response to the selected card was compared to the response for nonselected cards in 2 groups of Ss. One group was motivated to "deceive the operator and withhold responses." The other group was given no special instruction. The hypothesis that Ss who are motivated to deceive will more frequently produce disproportionately large skin resistance responses to critical items as opposed to noncritical items than will Ss who have not been so motivated was upheld. Ss who were motivated to deceive were more successfully detected. In addition detection took place at a much greater than chance level in the motivated group, while in the other group it occurred only at chance levels. The degree of autonomic response to significant stimuli appears to be a function of the motivational state of the S.

325. Gustafson, L. A., & Orne, M. T. Effects of perceived role and role success on the detection of deception. Journal of Applied Psychology, 1965, 49, 412-417.

Seventy-five college students participated in a detection of deception experiment designed to investigate conflicting results regarding the effect on the rate of detection of a preinterrogation demonstration of the polygraph's accuracy. It was hypothesized that the differences were due to differential demand characteristics in the 2 experiments. The information S received between Trials I and II and S's perception of his role were the major independent variables. If Ss received information which was consonant with their perceived roles, they were detected significantly less frequently than Ss who received information not consonant with their roles. The findings conform to the "consequences theory of detection" and support the hypothesized explanation of the disparate results.

326. Gustafson, L. A., & Orne, M. T. The effects of verbal responses on the laboratory detection of deception. Psychophysiology, 1965, 2, 10-13.

Ss were given one of three different response tasks to perform in a detection of deception experiment using the galvanic skin response (GSR). The first group was told to say nothing as they heard each question, the second group to say "no" to each question, and the third group to make a word association to each question. Questions were presented in both a random order and a known sequential order. There were over-all differences among the three groups for both conditions of questions presentation. The second group was most frequently detected, the first group next, and the third group was detected least frequently. Differences between experimental procedures used in this study and other studies using word association do not permit comparison of the results of this study with other studies.

327. Gustafson, J. E., Winokur, G., & Reichlin, S. The effect of psychic-sexual stimulation on urinary and serum acid phosphatase and plasma nonesterified fatty acids. Psychosomatic Medicine, 1963, 15, 101-105.

In an attempt to develop a quantitative chemical measure of the intensity of sexual arousal a study was made of urinary acid phosphatase secretion rate and plasma acid phosphatase levels in young men, as influenced by the viewing of a sexually arousing moving picture. In a group of 17 subjects, 12 showed an increase in urinary acid phosphatase secretion rate, but, this effect was not correlated with subjective response (as evaluated by questionnaires), nor was the enzyme response prevented by concomitant feelings of disgust or disapproval. Plasma acid phosphatase concentrations, measured in 12 subjects, did not change. In a control group of married women, significant changes in urinary acid phosphatase were not observed. Incidental observations that sexual arousal was accompanied by an increase in plasma nonesterified fatty acids were also made.

H

328. Haggard, E. A. Experimental studies in affective processes: I. Some effects of cognitive structure and active participation on certain autonomic reactions during and following experimentally induced stress. Journal of Experimental Psychology, 1943, 33, 257-284.

"The experiment was designed to study some of the factors involved in the establishment and modification of autonomic reactions of normal adult human Ss to stress induced by strong electric shock. Measures of palmar sweating were used to indicate the Ss' general level of autonomic activity and reactions to specific aspects of the situation. The tests were composed of three periods: I, the conditioning or stressful session, during which the Ss were asked to give chained associations to each of 42 stimulus words. They were always (and only) shocked between 10 and 12 sec, after the stimulus word sword, which recurred five times during the list; II, the therapy session, in which one of three experimental procedures was employed to alleviate the general disturbance and extinguish the specific reactions initiated during the first session; and finally, III, a test period to measure the relative effectiveness of the therapies. All three sessions were between 30 and 40 min. in length for all Ss... In general, those individuals who knew most about the conditions involved in the situation and who took an active attitude or role in facing this experience consistently showed less disturbance on all measures of autonomic reactivity during the stressful and therapy sessions."

329. Haggard, E. A. Experimental studies in affective processes: II. On the quantification and evaluation of measured changes in skin resistance. Journal of Experimental Psychology, 1945, 35, 45-56.

The purpose of the present paper is (a) to examine some of the problems involved in the quantification and evaluation of recorded changes in skin resistance, and (b) to propose a method which appears to satisfy certain basic tenets of mensuration. The problem is studied in a context dealing both with verbal and electrical shock stimuli.

330. Hall, P. S., & Prior, C. R. The cognitive factor in the extinction of a conditioned GSR. Psychonomic Science, 1969, 16, 74.

This study investigated the effect of cognition on the extinction of a conditioned GSR. The difference between extinction rates indicated that the Ss who could form the cognition that the UCS would no longer be presented extinguished more rapidly than Ss who could not. The data were interpreted as support for the role of awareness in the extinction of a classically conditioned response.

331. Hamilton, J. A. Psychophysiology of blood pressure. Psychosomatic Medicine, 1942, 4, 125-133.

Personality and behavior characteristics of 102 young male individuals with elevated blood pressure have been investigated, with suitable experimental and statistical controls. Corroborative evidence from 271 additional subjects has been presented.

Individuals with elevated blood pressure were found to tend, as a group, toward less physical and social activity. They tended to move and walk more slowly, and exhibited a definite tendency to avoid exercise and sports. They were somewhat less dominant and self-assertive; they had fewer friends and were somewhat more susceptible to anger. The principal symptoms reported were blushing and palpitation after exercise.

332. Handlon, J. H., Wadeson, R. W., Fishman, J. R., Sachar, E. J., Hamburg, D. A., & Mason, J. W. Psychological factors lowering plasma 17-hydroxycorticosteroid concentration. Psychosomatic Medicine, 1962, 24, 535-542.

While much recent evidence indicates that a variety of psychological stimulus conditions can elevate the circulating levels of hormones known to be responsive to stress, little work has been done exploring those conditions which might lower the levels of such hormones. Using 19 normal young adult male subjects viewing Disney nature-study films, it was discovered that the levels of plasma 17-hydroxycorticosteroid (17-OHCS) were lowered to a significant degree in comparison to : (1) a control period when no films were shown; and (2) a showing of emotionally arousing films. The clear difference in plasma 17-OHCS response to arousing and bland films (as measured by subject reports) suggests that the adrenal cortex responds to events of emotional significance within the range of mildly stressful, ordinary experience, and that the CNS regulation of adrenocortical function involves lowering as well as raising plasma 17-OHCS concentrations.

333. Harburg, E., Erfurt, J. C., Chape, C. Ecological stress areas, anger-guilt and blood pressure. Paper presented at the meeting of the Midwestern Psychological Association, Detroit, May 1971.

American negroes have higher blood pressure levels than whites. This study in Detroit yields evidence that such blood pressure differences vary with high and low stress areas, sex, and overweight. The relationships of blood pressure to anger-guilt patterns within each race, sex, area subset are examined.

334. Harburg, E., Julius, S., McGinn, N. F., McLeod, J., & Hoobler, S. W. Personality traits and behavioral patterns associated with systolic blood pressure levels in college males. Journal of Chronic Diseases, 1964, 17, 405-414.

Seventy-four white male college students were selected on the basis of high or low systolic readings taken on a registration line. Of a group of 21 students categorized as belonging to the high paired casual subgroup, 16 were also characterized as belonging to a "usual high" subgroup. A 3rd subgroup, the "sustained" high, was obtained by selecting those students who were high on both the paired casual and the "usual" readings (N=11). A consistent elevation of systolic pressure was associated with "submissiveness" and "sensitivity" as indicated by Cattell's 16 PF questionnaire. The high paired casual Ss tended to describe themselves as motivated to acquire social contacts but in a "sensitive" and "anxious" manner. Ss who showed only an initial systolic pressure elevation were found to yield in an argument and later alter their privately expressed opinions in the direction of agreement with their partners. Although obesity was highly correlated with higher systolic pressure, the psychological correlates of obesity were different from those related to either elevated "casual" or "usual" readings, i.e., obese Ss appeared to be physically active and more confident, although frequently in a test situation.

335. Harburg, E., McGinn, N. F., & Wigle, J. B. Recalled treatment by parents among college males and blood pressure-levels vs. variability. Journal of Psychosomatic Research, 1965, 9, 173-183.

It was hypothesized that Ss who report their parents as punitive, irritable and unloving have higher blood pressure than those who recall their parents in a more favorable light. The Ss were 93 university males. Recall of parents was measured by a semantic differential and questionnaire. Blood pressures were taken on 11 occasions. The data did not support the hypotheses. The measures of variability and reactivity of blood pressure were related to the psychological factors.

336. Harmon, G. W., & Reid, J. E. The selection and phrasing of lie-detector test control questions. Journal of Criminal Law, Criminology, and Police Science, 1955, 46, 578-582.

"The process of selection is one of trial and error." Careful study of the S, his abilities, background, and "probable honesty pattern" is essential. Control questions should first be introduced during the pre-test interview.

337. Harrison, J. The behavior of the palmar sweat glands in stress. Journal of Psychosomatic Research, 1964, 8, 187-191.

The palmar sweat glands fail to be activated by alerting stimuli under some occasions. It was hypothesized that an endocrine response to prolonged stress causes this. In 28 medical students, holding 1 leg horizontal (while seated) to exhaustion lowered palmar sweating, raised mean plasma cortisol levels, and caused pupillary dilation. Muscle exercise will not evoke this. Surprise at the difficulty of the task was implicated. The threat of injection was also found to significantly affect the palmar sweat glands.

338. Harvey, E. Psychological rigidity and muscle tension. Psychophysiology, 1966, 3, 224-228.

Our present approach may prove fruitful in identifying more specifically the psychological and physiological mechanisms involved in differentials in the management of stress, differentials in the occurrence of certain psychosomatic and somatic disorders, and so on: such "physiological styles" may be related to differences in patterns of gestures. Therefore, the more specific one can make linkages between gestural patterns and psychological set, the greater becomes the utility of more or less readily observable gestures in the diagnosis or prediction of psychological states.

339. Haseeth, K., & Astrup, C. Autonomic responses to verbal and electrical stimulation. Activitas Nervosa Superior, 1966, 8, 74-77.

Autonomic responses to verbal (consisting of the words: meanness, death, mother, sex) and electrical stimulation have been registered in a sample of 41 normal subjects and 162 patients with functional psychoses. The overall greatest autonomic reactivity was observed in the normal subjects. Borderline states distinguished themselves by high heart-rates and benignant schizo-affective psychoses had low reactivity to complex words. The malignant "process" schizophrenics were more reactive than the other patients to "complex words", but less reactive to electrical stimulation.

340. Haseeth, K., Shagass, C., & Straumanis, J. J. Perceptual and personality correlates of EEG and evoked response measures. Biological Psychiatry, 1969, 1, 49-60.

Somatosensory (SSER) and visual (VER) evoked responses and EEG were recorded in 40 healthy college students and the data were related to tests of extraversion, neuroticism, intelligence, simple visual perception (letter recognition, line difference discrimination), complex visual perception (closure flexibility, closure speed), and lifted weight discrimination. The results failed to confirm predictions that high ER amplitude would be associated with greater extraversion and poorer perceptual performance. The data did indicate that ER-EEG amplitude concordance, in the sense that both were either high or low, was greater when performance on the simple visual perceptual and weight discrimination tasks was superior. Above average performance on these task was also associated with intermediate degrees of EEG frequency dispersion. Trends suggesting that ER-EEG amplitude concordance may differ with respect to the personality and intelligence tests were also noted. ER-EEG concordance and frequency dispersion appear to be indicators of central regulatory mechanisms with functional correlates in the perceptual sphere.

341. Hastings, S. E. The heart as a bi-directional response system. Paper presented at the meeting of the Society for Psychophysiological Research, Washington D. C., October 1968.

HR, GSR, EMG and Respiration were recorded while 25 young adult Ss watched a suspense film. HR was analyzed second by second for 96 episodes representing Anticipatory Fear, Other Emotion, and three conditions of Immediate Anticipation, Attention, and Searching, each with and without Fear. The results were: 1. There was significant group deceleration during the Fear condition. 2. There was significant deceleration by one test, not by another, during Anticipation and Attention. 3. There was significant deceleration during Other Emotion, i.e. episodes of mostly unpleasant emotion when pilot Ss had decelerated. 4. Average group deceleration lasted up to 1.5 minutes and two Ss had deceleratory patterns lasting 5 minutes during the most exciting scene. 5. Two extreme groups of good and poor decelerators showed consistent differences during emotional scenes.

342. Hathaway, P. W., Brehm, M. L., Clapp, J. R., & Bogdonoff, M. D. Urine flow, catecholamines, and blood pressure. Psychosomatic Medicine, 1969, 31, 20-30.

The relationship of catecholamines, urine flow, blood pressure, and other variables were studied in 34 healthy college males placed alone in a laboratory relatively free of external stimuli. Urine was collected pre and post ingestion of water, and the urine flow was found to vary widely in a single individual, both pre and post ingestion of water. The initial urinary flow and excretion rates of norepinephrine (NE) and epinephrine (E) correlated with the degree of water diuresis which occurred within 1 hr. after ingestion of water. The urinary excretion rates for NE and E were also positively correlated with the magnitude of urine flow following water ingestion as well as with systolic and diastolic blood pressure. The heart rate was positively correlated only with E excretion.

Serial Nowlis mood-adjective check lists revealed that subjects with a high urine flow checked less anxiety adjectives on arrival. They also checked more adjectives for pleasant feelings at the end of the study and showed an increase in generalized activation items.

343. Heath, H.A., Oken, D., & Shipman, W. G. Muscle tension and personality: A serious second look. Archives of General Psychiatry, 1967, 16, 720-726.

This paper reports a study designed specifically to confirm an earlier finding which indicated a relation between certain personality characteristics and muscle tension in a group of depressed patients. Subjects were chosen from applicants at our outpatient psychiatric clinic; they were selected to represent the high and low extremes on six criteria which were believed to be related to muscle tension. Twenty men and 24 women ranging in age from 18 to 49 years, participated in the research. Muscle tension scores were obtained under five experimental conditions: rest, white noise, recovery, psychological stress, and a second recovery. All results failed to confirm the hypotheses which were derived from the earlier study. Attempts were made to explain these negative findings on the bases of possible artifacts either in the earlier study or in the present study and/or on the bases of a different patient population. The chief conclusion was that relations between muscle tension and personality factors vary as a function of the type of individuals being studied, and that findings concerning depressives do not necessarily apply to other patient groups.

344. Heath, R. G., & Gallant, D. M. Activity of the brain during emotional thought. In R. G. Heath (Ed.), The role of pleasure in behavior. New York: Harper & Row, 1964. Pp. 83-106.

The study by Heath and Gallant of brain activity during emotional thought in human subjects is a pioneering research venture. Each of 54 human subjects with electrodes deeply implanted into the brain was interviewed over a period of time. The Tulane investigators found that emotional thought was associated with pronounced changes in electrical activity in deep, specific regions of the olfactory system of the brain, as measured by electroencephalographic amplitude and frequency. Curiously and significantly, these electrical changes in deeper-lying structures of the brain occurred only with old emotion-laden memories. Current emotionally charged situations, such as anger directed at a ward attendant, produced loud curses and similar overt expressions of emotion but no remarkable changes in electrical activity recorded from the deep olfactory structures of the brain. Furthermore, the revival of old emotional memories during the interviews was not necessarily accompanied by overt displays of emotion, as was the case with recent emotional experiences.

345. Hein, P. L., Cohen, S. I., & Shmavonian, B. M. Perceptual mode and cardiac conditioning. Psychophysiology, 1966, 3, 101-107.

Conditional heart rate responses were measured for field-dependent and field-independent subjects. The conditional stimulus (CS) was a colored light and the unconditional stimulus (US) was an electric shock delivered to the finger. The CS-US interval was 10 sec. The field-independent subjects demonstrated an initial cardiac acceleration followed by a cardiac deceleration, whereas the field-dependent subjects showed only cardiac deceleration. When these data are compared with the previously reported galvanic skin response (GSR) data, a model of sympathetic-parasympathetic reactivity is evolved wherein the field-independent group shows both conditioned sympathetic and parasympathetic autonomic activity, while the field-dependent group shows only parasympathetic activity.

346. Helmreich, R., & Hamilton, J. Effects of stress, communication relevance, and birth order on opinion change. Psychonomic Science, 1968, 11, 297-298.

Subjects under high or low fear were presented with a communication: those under high fear showed significantly greater change on topics both relevant and irrelevant to the source of fear. There was a nonsignificant tendency for first-born Ss to show more change. Fear manipulation was confirmed by two stress measures, Mood Adjective Check List and Palmar Sweat Index.

347. Helson, H., & Quantius, L. Changes in skin temperature following intense stimulation. Journal of Experimental Psychology, 1934, 17, 20-35.

This study concerns the changes in skin temperature following intense stimulation, measured by means of a thermocouple potentiometer. The results of the experiment are summarized as follows: (1) There is a tendency for some stimuli to cause predominantly positive temperature changes while others show more negative changes. The variations in temperature may be as large as 4 degrees. (2) Almost any sort of stimulation will cause temperature change if intense and sudden enough, or if it possesses "stimulating character" such as is found in crucial words of the word-associations test. Often anticipation of an unpleasant stimulus caused more change than the stimulus itself. (3) The presence or absence of emotional states cannot be inferred from the temperature response, although there is a tendency for large changes to be accompanied by reportable internal changes.

348. Henkin, R. I. The prediction of behavior response patterns to music. Journal of Psychology, 1957, 44, 111-127.

The purpose of the GSR study was to see if the organization indicated verbally could be shown by means of another subject response, a physiological response such as that measured by a GSR. An interpretation of the results of the GSR study indicated that the physiological responses of the subjects could be organized on the same basis upon which they were previously organized verbally. As in the factor study the GSRs are not significantly dependent upon musical style, dynamics, orchestration and timbre, and other compositional techniques. They appear clearly dependent upon the melodic and rhythmic content of music. However, as opposed to the results of the factor study, the subject physiological response appears to be controlled to some degree by the musical education and experience of the listeners.

349. Herr, V. V., & Kobler, F. J. Instructions and personality type as related to GSR changes. Journal of General Psychology, 1957, 57, 297-305.

The lack of a significant difference traceable to either the type of instruction, or the traits of a person, in the association responses evoked after such instructions, gives the investigator some hope of attaching a constant value to the stimuli themselves. The finding seems to be of vital importance to those who would wish to use galvanic association responses in any sort of predictable way. A secondary finding is that the stimuli themselves have a constant value from experiment to experiment, even when different Es are involved. This will not be expected to be the case unless very rigid conditions are imposed in the way of standardizing the measurement situation as a whole. It is not even apparent that the constancy would hold up if the order in which the stimuli were given was changed, or if different buffer words were used between the stimuli, or if the rate of change of the basic conductance changes were not controlled. Further tests will have to be made in order to determine just what effect the rate of change of basic conductances might have upon the magnitude and direction of the GSR. More work is needed in order to generalize these findings beyond the types of persons chosen, or beyond the kind of instructions used. It is not to be hypothesized that types of responses other than those occurring during the so-called free association process would show the same constancy as those in this experiment.

350. Hess, E. H. Attitude and pupil size. Scientific American, 1965, 222 (4), 46-54.

Dilation and constriction of the pupils reflect not only changes in light intensity but also ongoing mental activity. The response is a measure of interest, emotion, thought processes and attitudes.

351. Hess, E. H. Pupillometric assessment. Research in Psychotherapy, 1968, 3, 573-583.

Pupillometrics can aid in basic research on the personality dynamics of specific disorders as well as in diagnosis and evaluation of therapy. Comparison of basic attitudes manifested in different syndromes, such as shown by the responses of male homosexuals and Don Juans to females, certainly provides fundamental and objective information important for understanding the underlying motivational bases of these personality complexes. Not only is pupillometrics of potential value in assessing emotional processes in pathological problems but also in areas such as career counseling, premarital and marital counseling, child rearing, personnel selection, and motivation and attitude research.

352. Hess, E., & Polit, J. M. Pupil size as related to interest value of visual stimuli. Science, 1960, 132, 349-350.

Increases in the size of the pupil of the eye have been found to accompany the viewing of emotionally toned or interesting visual stimuli. A technique for recording such changes has been developed, and preliminary results with cats and human beings are reported with attention being given to differences between the sexes in response to particular types of material.

353. Hess, E. H., & Polt, J. M., Changes in pupil size as a measure of taste difference. Perceptual and Motor Skills, 1966, 23, 451-455.

These data offer strong evidence that pupillary activity mediated by the sympathetic division of the autonomic nervous system can be used as an indicator of taste sensitivity and perhaps taste preference. Although the pupillary response to water proved to be fairly even if the initial presentation was disregarded, it was largest for orange beverage 3, which was not in the first position in either of the two reverse orders used. The data of the present study suggest that there may be a close relationship between pupillary response and activity in the parietal cortex, the cortical brain area related to taste stimulation. The relative homogeneity of the stimuli used indicates the degree of sensitivity of the response, since it was possible to select one stimulus as clearly superior.

354. Hess, E. H., Seltzer, A. L., & Shlien, J. M. Pupil response of hetero- and homosexual males to pictures of men and women. Journal of Abnormal Psychology, 1965, 70, 165-168.

The pupil response of each individual in a group of heterosexual males was greater when looking at pictures of women than when looking at pictures of men. Homosexual males responded in the opposite direction. Measurement of changes in pupil size permitted clear-cut discrimination between the 2 groups.

355. Hicks, R. G. Experimenter effects on the physiological experiment. Psychophysiology, 1970, 7, 10-17.

Human subjects establish expectancies that often reflect the investigators' orientation before and during an experiment. The purpose of this experiment is to determine the effects of subject expectancies as inadvertently influenced by the investigator in a perceptual-physiological experiment. Even to the point where the principal investigator's choice of an "experimental naive" assistant still reflects his expectancies. Eighteen adult male subjects were randomly assigned to one of three different naive experimenters; (1) an automated procedure, (2) a reserved female and (3) a sociable female. All the subjects were tachistoscopically presented with 76 four letter words which included both socially acceptable and taboo words. The subjects' physiological responses were monitored during the entire experiment. The words were grouped according to their social desirability and were analyzed by a trend analysis of variance. The results demonstrate that both the subject's physiological responsivity and his reporting of socially acceptable and taboo words are dependent upon the experimenter.

356. Hill, F. A. Effects of instructions and subject's need for approval on the conditioned galvanic skin response. Journal of Experimental Psychology, 1967, 73, 461-467.

This study was undertaken to explore the effects of instructions regarding how to respond (facilitatory and inhibitory) on the conditioning of the galvanic skin response, and to examine, through the use of a relevant personality measure, individual differences in compliance to those instructions. The data revealed differential responding in accord with the instructional set and, although differential compliance was not demonstrated, behavioral differences were observed with respect to the personality extremes employed. On the assumption that the CS-UCS interval might have to be extended for instructional and personality variables to operate, 2 different interstimulus intervals were employed. The results suggested that instructions might have an effect upon the classical interstimulus interval function.

357. Hill, F. A. Effects of UCS predictability in GSR conditioning. Psychonomic Science, 1969, 17, 195-196.

Forty Ss were given 14 partially reinforced acquisition trials followed by 8 extinction trials, using a classical GSR conditioning procedure. For one group, the occurrence or nonoccurrence of the UCS was predictable, while this was not the case for the other group. Results indicated that UCS predictability led to significantly lower response magnitude.

358. Hirschman, R., & Katkin, E. S. Relationship among attention, GSR activity and perceived similarity of self and others. Journal of Personality, in press.

Recent studies have demonstrated that perceiving characteristics in others which resemble those of oneself is an important variable in inducing differential autonomic responsivity or mood induction under conditions of threat or suffering. The present study was designed to test the hypothesis that autonomic change is part of the identification process in a nonstressful paradigm. Simulated taped interviews were prepared varying the dimensions of amount of work and success in college. Emotional expressions by the interviewees was kept to the minimum. College Ss responded with a significantly larger number of nonspecific GSRs to a tape identified by them as being more like themselves than to a tape identified as being less like themselves. The nonsignificant comparisons of tapes were discussed in terms of the importance of cognitive activity on autonomic responsivity.

359. Hoagland, H., Cameron, D. E., & Rubin, M. A. Emotion in man as tested by the delta index of the electroencephalogram: I. Journal of General Psychology, 1938, 19, 227-245.

1. Electroencephalograms have been recorded from 23 psychotic patients and normals who were at intervals stimulated emotionally by comments or questions known from the individual's history to have produced emotional responses. Control indifferent material was also presented. In one series of 15 experiments on 12 individuals, pulse frequencies were measured with an electrocardiograph.

2. Both the heart beat frequency and the delta index (550 values) of the electroencephalogram are found to be enhanced immediately following strong emotional stimulation of psychotic patients and normal persons.

3. The heart rate is also accelerated by a variety of indifferent stimuli when the subject is called upon to play other than a passive, silent role in the experiment. This does not apply to the delta index which thus appears to parallel more closely the presumed subjective emotion as judged from previous behavior of the subjects during psychiatric interviews and by subsequent verbal admissions.

4. Frequent repetition of the same emotional stimulus results regularly in adaptation of the delta index and, in the majority of cases, in the heart rate (6 experiments with 6 individuals).

360. Hoagland, H., Cameron, D. E., Rubin M. A., & Tegelberg, J. J. Emotion in man as tested by the delta index of the electroencephalogram: II. Simultaneous records from cortex and from a region near the hypothalamus. Journal of General Psychology, 1938, 19, 247-261.

Human electro-encephalograms were recorded simultaneously from the occiput and from a region near the hypothalamus. For the latter recording, an electrode was inserted in the roof of the pharynx in close proximity to the hypothalamus, according to the method of Grinker. Alpha waves were found at the hypothalamus, corresponding in frequency to cortical frequencies. Opening the eyes inhibited the alpha waves from the hypothalamus. Though the hypothalamic delta index is raised by emotional questions, it is not very reliable, because it is susceptible to muscle artifacts. Delta waves at the hypothalamus precede those at the cortex by about 4 milliseconds. "It is suggested that the delta waves from near the hypothalamus following emotional stimulation correspond to activity in this autonomic motor center, and that the corresponding cortical delta waves occurring a few milliseconds later may be the cortical signal of some conscious correlate of the emotional response."

361. Hodges, W. F., & Spielberger, C. D. The effects of threat of shock on heart rate for subjects who differ in manifest anxiety and fear of shock. Psychophysiology, 1966, 2, 287-294.

Although there is growing consensus that psychophysiological response to stress is in part a function of the Ss' definition of the situation, many investigators continue to ignore individual differences in Ss' interpretation of stressor situations. In this study, high (HA) and low (LA) anxiety Ss were run in Threat of Shock and No Threat Conditions. The Threat Condition produced a significant mean increase in heart rate (HR) as compared to the No Threat Condition, but there was no difference in the HR response of HA and LA Ss to threat of shock. However, Ss who reported moderate to extreme fear of shock two months prior to the experiment responded with greater HR acceleration than Ss who reported little or no fear. These findings were discussed in terms of a conceptualization of "anxiety" which distinguishes between anxiety as a transitory state of the organism and as a relatively permanent personality trait. It was concluded that Ss' "cognitive appraisal" of an experimental situation was an important determinant of psychophysiological responses to stress.

362. Hokanson, J. E. Some physiological and behavioral concomitants of experimentally aroused anger. (Doctoral dissertation, University of Wisconsin) Ann Arbor, Mich.: University Microfilms, 1959. No. 59-5780.

This study investigates some of the physiological and behavioral concomitants of experimentally aroused anger. Eighty undergraduate males, who scored either consistently above (High Test Hostility) or below (Low Test Hostility) the median on three psychometric instruments measuring readiness to express aggression were used. Half of the Ss in each group were highly frustrated by E, while the remaining Ss were placed in a low frustration control condition. In an orthogonal arrangement, half of the Ss had been previously led to believe that E had the potential for inflicting physical pain to them via electric shocks if they did not cooperate fully during the experiment (retaliatory anxiety condition).

Following these experimental manipulations Ss were given a number of socially sanctioned opportunities to aggress against E by administering electric shocks to him. Ss' behavior with respect to the plunger activating the shock was analyzed along three dimensions: the number of shocks administered, the average duration per shock, and the mean pressure exerted while activating the shock.

Changes in systolic and diastolic blood pressure and skin conductance were measured during (a) the retaliatory anxiety manipulation, (b) the frustration manipulation, (c) aggressing against E and (d) a final rest period.

The results are discussed in terms of which behavioral measures are reliable indicators of instigation to aggression and in regard to the possible role of "aggression-anxiety" as a factor in the overt expression of aggression.

363. Hokanson, J. E., & Burgess, M. The effects of status, type of frustration, and aggression on vascular processes. Journal of Abnormal and Social Psychology, 1962, 65, 232-237.

The results which were consistent over both physiological measures, are as follows:

1. Both ego threat and blocked goal frustration produce a significant increase in systolic blood pressure and heart rate relative to the no frustration control group.

2. For both types of frustration, having a postfrustration opportunity to verbally aggress against the low status frustrator results in a return of vascular processes to levels not significantly different from those of a no frustration control group; whereas having no aggression opportunity with a low status frustrator results in maintenance of the frustration produced elevations.

3. With a high status frustrator, opportunity to aggress, on the whole did not substantially reduce vascular elevations relative to comparable opportunity to aggress with a low status frustrator.

4. Subjects who were in one of the frustration conditions or were seen by the high status experimenter had significantly elevated vascular processes at the close of the experiment (postaggression measure) when compared to subjects in the no frustration or low status experimenter conditions.

364. Hokanson, J. E., & Burgess, M. The effects of three types of aggression on vascular processes. Journal of Abnormal and Social Psychology, 1962, 64, 446-449.

The results indicated that frustrated subjects who were given an opportunity to physically or verbally aggress against the frustrator, manifested returns on both physiological measures to the levels of the Low Frustration control subjects. Frustrated subjects in the Fantasy and No Aggression conditions exhibited significantly elevated systolic pressures and heart rates at the postaggression recording of these measures.

The results were discussed as offering support for the hypothesis that the expression of Physical or Verbal aggression towards a frustrator tends to reduce general, physical arousal.

365. Hokanson, J. E., Burgess, M., & Cohen, M. F. Effects of displaced aggression on systolic blood pressure. Journal of Abnormal and Social Psychology, 1963, 67, 214-218.

Eighty college age Ss were placed in a 2 x 5 factorial design involving a high or low frustration experience followed by opportunity to express physical aggression towards objects varying in similarity to the frustrator. Postaggression systolic blood pressure elevation relative to prefrustration base level was the primary dependent measure. The results indicated that among frustrated Ss the expression of aggression directly to the frustrator resulted in a significant degree of "physiological tension" reduction relative to a no aggression control group;

whereas the same amount of aggression expressed to substitute targets did not significantly reduce blood pressure.

366. Hokanson, J. E., & Edelman, R. Effects of three social responses on vascular processes. Journal of Personality and Social Psychology, 1966, 3, 442-447.

Two separate studies were conducted to investigate the effects of various social responses on vascular processes. It was found that: (a) receipt of a noxious stimulus caused by a "fellow S" produced systolic elevations of 6-10 mm.; (b) an aggressive counterresponse was followed by a relatively rapid return of the vascular measures to the prefrustration base level; (c) friendly or ignoring counterresponses were followed by a relatively slow return to base line comparable to that of control Ss who were given no opportunity to respond; (d) the above results were obtained with the systolic blood pressure and a vasomotor response but not with diastolic blood pressure or heart rate. These results were obtained only with male Ss, female Ss showing no differential recovery rates.

367. Hokanson, J. E., & Shetler, S. The effect of overt aggression on physiological arousal level. Journal of Abnormal and Social Psychology, 1961, 63, 446-448.

Ss were exposed to frustrating conditions involving frustrators of high and low status, with or without an opportunity to give the frustrator an electric shock. Tension level (TL) was measured by systolic blood pressure. TL increased under conditions of frustration; returned to prefrustration level when S was able to retaliate against low-status frustrators, and remained high only when S was not able to express aggression against low-status frustrators. The results suggested that under certain conditions overt aggression was tension reducing; under others, TL may be reduced by other behavior, e.g., withdrawal.

368. Hokanson, J. E., Willer, K. R., & Koropsak, E. The modification of autonomic responses during aggressive interchange. Journal of Personality, 1968, 36, 386-404.

A view of the catharsis phenomenon is proposed in this paper which is based on an avoidance learning paradigm applied in a social context. In this approach an attempt is made to relate social behavior and autonomic concomitants in situations involving aggression. Two laboratory studies are reported in which both social and autonomic responses are altered as predicted by an avoidance learning model. The implications of the model with respect to the existing literature and future directions of research are discussed.

369. Holmes, D. S. Effects of overt aggression on level of physiological arousal. Journal of Personality and Social Psychology, 1966, 4, 189-194.

As part of a larger study, hostility was aroused in 56 Ss who were then permitted or not permitted to respond with aggression. Ss not permitted to respond with aggression reduced their physiological arousal level (blood pressure or heart rate) significantly more than Ss who were permitted to respond with overt aggression to the frustrator. This result is exactly opposite to the general finding reported in 4 studies by Hokanson and his associates. It was suggested that the results of the studies by Hokanson and his co-workers might reveal as much about the nature of the maintenance of a high level of physiological arousal as they do about the nature of the reduction of physiological arousal accompanying expressions of aggression.

370. Holmes, T. H., Goodell, H., Wolf, S., & Wolff, H. G. The nose. Springfield, Ill.: Charles C. Thomas, 1950.

Special interest attaches to nasal changes which were found to be associated with conflict and with feelings of humiliation, frustration and resentment. The same changes often accompanied frank weeping or a state of being on the "verge of tears." There occurred initial redness of the mucous membranes of the nose with marked swelling of the turbinates and nasal mucosae, profuse secretion and obstruction. Complaints of difficulty in breathing often ensued.

Situations productive of abject fear with minimal conflict, of dejection and disgust and of erotic feelings accompanying sexual activity when conflict was absent, were associated with vaso-constriction and pallor in the nasal mucosa, decreased secretion and shrunken turbinates.

When threatening life situations productive of conflict were sustained, the associated nasal changes, which might at first have been predominantly unilateral, became persistent and bilateral. Moreover, when swelling and obstruction persisted, pain and tenderness occurred and spread over the zygoma into the temporal region.

Nasal function was found to be linked with sexual function. The nasal hyperactivity which accompanied menstruation, pregnancy and erotic activity, however, was usually of minor degree but became accentuated and gave rise to symptoms when accompanied by situations arousing conflict.

371. Holmes, T. H., Treuting, T., & Wolff, H. G. Life situations, emotions and nasal disease: Evidence on summative effects exhibited in patients with "hayfever." Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 545-565

1. A life situation engendering conflict and anxiety and a response of nasal hyperfunction 1) enhances the intensity of the symptoms of rhinitis, and the magnitude of the mucous membrane response already present in "sensitive" subjects; or 2) enhances the response of the nasal tissues to an additional assault by pollen.

2. Parasympathetic neural impulses to the nose appear to be responsible for the production of the nasal hyperfunction which accompanies the individual's reaction to a situation of conflict.

3. The character of the hay fever syndrome appears to depend not only on the intensity of the nasal hyperfunction produced by the exposure of "sensitive" individuals to pollen, but on the magnitude and duration of the hyperemia, hypersecretion and swelling in the nasal chambers provoked by other threats and assaults to bodily integrity. Of major importance among these etiologic factors is a life setting engendering conflict and anxiety.

372. Holmes, T. H., & Wolff, H. G. Life situations, emotions and backache. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 750-772.

Patterns of skeletal muscle participation in the behavior of 65 subjects with backache and 10 without backache have been studied and the following inferences drawn:

1. A pattern of skeletal muscle hyperfunction characterized by a generalized and sustained increase in motor and electrical activity was a common accompaniment of the reaction of subjects exhibiting the backache syndrome to situations which threatened their security and engendered apprehension, conflict, anxiety and feelings of resentment, hostility, humiliation, frustration and guilt.
 2. This pattern of skeletal muscle hyperfunction appeared to be an integral component of an "action" pattern of behavior utilized extensively by the subjects exhibiting the backache syndrome in their attempts to achieve satisfactory interpersonal and social adjustments and maintain their security.
 3. Generalized and sustained skeletal muscle hyperfunction occurring as part of an individual's reaction to a threatening life situation engendering conflict, anxiety and other strong emotions was often provocative of pain in the back, neck and extremities.
 4. Strenuous activity and trauma appeared to have enhanced etiologic significance in the genesis of the backache syndrome when they took place in the setting of a threatening life situation evolving from difficulties in social and interpersonal adjustments which engendered generalized skeletal muscle hyperfunction.
373. Horwitz, M., Glass, D. C., & Niyekawa, A. M. Muscular tension: Physiological activation or psychological act? In P. H. Leiderman & D. Shapiro (Eds.), Psychobiological approaches to social behavior. Stanford, Calif.: Stanford University Press, 1964. Pp. 59-91

We began this chapter by proposing that muscular deactivation, although a small unit of behavior not detectable by the unaided eye, is nevertheless a directed psychological act. We further proposed that level of tension indicates the intensities of the approach-avoidance tendencies that operate during this act. According to these assumptions, muscular deactivation has the same conceptual status as the act of running toward a goal or away from an avoidance; muscular tension has the same status as such other measures of response intensity as speed of running or strength of pull while overcoming a restraint. The evidence is clear-cut that in line with these assumptions, muscular deactivation obeys the general psychological laws that relate the strength of approach-avoidance tendencies to the variables of subjective probability and valence.

374. Howes, D. H., & Solomon, R. L. A note on McGinnies, "Emotionality and perceptual defense". Psychological Review, 1950, 57, 229-234.

McGinnies' actual experiment and its results can be summarized as follows: "(1) The duration at which verbal discrimination appears is of the same order for taboo and for neutral words, when the effects of Thorndike-Lorge frequencies are extracted. (2) Taboo words elicit strong GSRs (3) Only the most probable word could be reported after each exposure, but GSR could occur to any word of high probability that had been conditioned previously to elicit GSR. (4) McGinnies' experimental situation would tend to 'set' his subjects to inhibit overt report of those words eliciting strong GSRs."

375. Hunt, W. A., & Landis, C. Word-association, reaction time, and the magnitude of the galvanic skin response. American Journal of Psychology, 1935, 47, 143-145.

In the present study 14 normal, 4 D. P., and 4 manic-depressive S's were used. Two different series of association words were used. A Wheatstone bridge and a Leads and Northrup reflecting galvanometer were used to register the galvanic deflections. The results show a tendency, neither strong nor reliable for a positive correlation between the reaction time and the galvanic response. Only one S gave a correlation 4 times its probable error in both stimulus series. The rank-order correlation between the correlations obtained on the two series is $-0.14 \pm .14$. This variability of performance is suggested as the explanation of the conflict between the results obtained by different investigators. No difference between the normal and psychopathic cases is found.

376. Hutt, L. D., Jr. Selective attention: The relationship between pupil size and recognition threshold. (Doctoral dissertation, University of Arkansas) Ann Arbor, Mich.: University Microfilms, 1968. No. 68-9656.

A plausible mechanism of perceptual defense is the pupil response to emotional stimuli. It seems reasonable to suppose that the taboo words used in perceptual defense studies initiate pupil constriction, and that with the pupil admitting less light into the eye the recognition threshold is raised. Stated in other words, there should be a negative correlation between pupil size and recognition threshold.

In an effort to evaluate this hypothesis, words representing three different categories of emotional connotation -- Taboo, Pleasant, and Unpleasant -- were presented both pupilometrically and tachistoscopically to forty volunteers from general psychology. Pupil size and recognition threshold for each word was determined and correlations between these two variables obtained. As predicted, pupil size and recognition threshold were found to be significantly and negatively correlated. Correlation coefficients within the Taboo Category and the Pleasant Category were found to be significant, whereas the correlation coefficient within the Unpleasant Category did not reach significance. The non-significant r within the Pleasant Category was attributed to the fact that the words in this experiment were selected intuitively.

377. Hutt, L. D., & Anderson, J. P. The relationship between pupil size and recognition threshold. Psychonomic Science, 1967, 9, 477-478.

Words representing a broad range of emotional connotation (taboo, pleasant, and unpleasant) were presented both pupilometrically and tachistoscopically to college students. As predicted, a statistically significant negative correlation was obtained between pupil diameter and recognition thresholds of the words. The results were interpreted as offering tentative support of the notion that the pupil response to emotional stimuli is the mechanism of perceptual defense and vigilance.

378. Hyde, I. H., & Scalapino, W. The influence of music upon electrocardiograms and blood pressure. American Journal of Physiology, 1918, 46, 35-38.

A survey of the preliminary results obtained with the three classes of music indicates that in the subjects experimented on, the minor tones of music increased the pulse rate and action current of the ventricular contraction, and lowered the systolic and diastolic pressures. On the other hand, the stirring notes of Toreador's song, and also those of the rhythmical march, increased the systolic and pulse pressure, but the former also increased the pulse rate, with decreased diastolic pressure and action current, while the march slowed the cardiac cycle and increased its action currents. It is possible that a careful selection of music may be a beneficial aid in the treatment of nervous disturbances.

379. Innes, G., Millar, W. M., & Valentine, M. Emotion and blood-pressure. Journal of Mental Science, 1959, 105, 840-851.

In an investigation of blood-pressure changes during interview, it was found that random emotional stresses were uncovered which had potent pressor effects in normal controls, in hypertensives and in neurotics. It was notable that the diastolic increases were proportionately greater than the systolic, and that those random emotional stresses on average possessed more pressor effect than a deliberately imposed physiological stress such as breath-holding. Certain individuals also showed marked pressor responses to varied stimuli such as being asked to do mental arithmetic, or the desire to micturate.

All subjects showed an increase in systolic and diastolic pressures at the start of interview; in the control group this tended to level off symmetrically as the interview closed, but the hypertensive and neurotic groups showed a sustained rise of pressure and the resting levels after interview did not fall as low as the pre-interview resting values.

No consistent topics were found to be pressor in effect, but it appeared that pressor responses occurred (1) with novel or "alerting" stimuli; (2) when the subject talked about herself, about illness or about her husband; (3) when the subject's verbal output increased.

It is concluded that two types of emotionally-caused pressor responses may exist; one which may be keyed to the life-situation and is sustained in effect over a period of hours or days or longer, and another which is more transient and may represent a non-specific alerting reaction.

380. Ira, G. H., Jr., Whalen, R. E., & Bogdonoff, M. D. Heart rate changes in physicians during daily "stressful" tasks. Journal of Psychosomatic Research, 1963, 7, 147-150.

Radiotelemetry of the electrocardiogram has provided a technique for constantly recording the heart rate during so-called "stressful" life situations in a group of physicians-in-training and medical students. Observations during 38 various "stressful" tasks were recorded, including conference presentation by staff physicians, cardiac catheterization by clinical fellows, and ward-round presentations by medical students. Marked and sharp rises in heart rates occurred in almost all subjects. The peak changes were most often of short duration, but in some individuals sustained levels of tachycardia persisted throughout several minutes to over an hour of observation. Urinary catecholamine excretion rates were also measured during the performance of cardiac catheterizations and significant increases in adrenaline excretion were observed in association with the prolonged tachycardia.

381. Irwin, D. A., Knott, J. R., McAdam, D. W., & Rebert, C. S. Motivational determinants of the "contingent negative variation." Electroencephalography and Clinical Neurophysiology, 1966, 21, 538-543.

1. The motivational correlates of the vertex negative slow potential shift seen during reaction time foreperiod, called "the contingent negative variation" or "expectancy wave", have been studied in two experiments with young adult human males.

2. In the first experiment, a manual response to a visual stimulus was determined by the position of the preceding auditory signal. Measurable CNVs following the auditory signal were seen in all conditions, but they were significantly larger when a manual response was made to the second visual stimulus. No significant relationships were seen between CNV magnitude and either reaction time or anticipatory EMG activity.

3. In the second experiment, left and right tones were followed by weak and by painful finger shock, respectively. Key-press to both shocks was instructed on one half of the trials with order counterbalanced. CNVs were larger when the warning signal indicated painful rather than weak shock would occur, and CNVs were also larger during response than non-response conditions. No interaction was seen. Although reaction times were significantly shorter to the strong shock, a significant correlation between CNV magnitude and reaction time could be demonstrated only within the weak shock condition.

4. These results were interpreted as indicating that if the contingent negative variation is a measure of "expectancy" then the definition of such a term must explicitly include motivational factors.

382. Irwin, D. A., Rebert, C. S., McAdam, D. W., & Knott, J. R. Slow potential changes (CNV) in the human EEG as a function of motivational variables. Electroencephalography and Clinical Neurophysiology, 1966, 21, 412-413.

This report describes 4 reaction time experiments seeking other psychological correlates of the "contingent negative variation" (CNV) besides "expectancy". These data suggest that "expectancy" per se, is not the unique psychological correlate of the CNV; conditions which increase the energizing factors in behavior ("motivation", "drive", "activation", etc.) also increase the magnitude of the CNV.

J

383. Jackman, N., Schottstaedt, W., McPhail, S. C., & Wolf, S. Interaction, emotion, and physiologic change. Journal of Health and Human Behavior, 1963, 4, 83-87.

Emotional stress from interpersonal relations in a metabolic ward was related to physiological changes. Results suggest that interpersonal conflict arising in well-structured small group situations is the main source of emotional stress, though other factors enter.

384. Jacobs, A. Formation of new associations to words selected on the basis of reaction-time GSR combinations. Journal of Abnormal and Social Psychology, 1955, 51, 371-377.

Word association reaction time and GSR are used to separate five letter words of known familiarity into four groups; words associated with either avoidance habits or disruptive emotional states, unfamiliar words, moderately familiar words connected with nondisruptive emotional states, and familiar and non emotional words. The hypothesis that the ease of forming new associations to these words should inversely reflect the amount of emotionality attached to the words is supported; however, no differences between the four categories of words appeared, probably due to contamination between the categories.

385. Jenkin, N. Affective processes in perception. Psychological Bulletin, 1957, 54, 100-123.

The studies reported in this paper are classified into four general areas: (a) studies of size judgement; (b) studies of the relationships between physiological needs and perception; (c) studies on "selective sensitization" to positively valued stimuli; and (d) studies concerned with "perceptual defense." A section is also included on the various ways of defining the term perception. The author concludes that a need exists for further research, replication of existing studies, improved methodology, and a greater concern for theoretical objectives.

386. Jenks, S. R., & Deane, G. E. Human heart rate responses during experimentally induced anxiety: A follow-up. Journal of Experimental Psychology, 1963, 65, 109-112.

Base-level measurements of cardiac activity were made while Ss watched the sequence of Numbers 1 through 12 appear on a memory drum. Half of the Ss were then told to expect shock and half told to expect an extremely loud tone during Number 8, 9, or 10. Half of the shock Ss received 1 shock and half of the tone Ss received 1 tone. Other Ss received no noxious stimulus. All Ss showed an acceleration in rate during Numbers 1 through 6 and a deceleration during Numbers 8 through 10. The amplitude of the acceleration or deceleration was not dependent upon whether or not the noxious stimulus was received, but the shock-anticipation group showed greater acceleration than the tone group.

387. Johnson, D. T., & Spielberger, C. D. The effects of relaxation training and the passage of time on measures of state- and trait-anxiety. Journal of Clinical Psychology, 1968, 24, 20-23.

Effects of relaxation training and the passage of time on self-report and physiological measures of anxiety were investigated for 48 hospitalized psychiatric patients. State-anxiety (A-state) measures were systolic blood pressure, heart rate, and the Zuckerman Affect Adjective Check List which required Ss to indicate feelings at the time the physiological measures were taken. Trait-anxiety (A-trait) measures were the Taylor Manifest Anxiety Scale and the Affect Adjective Check List with Ss instructed to indicate how they usually or generally felt. A-state measures declined significantly in response to the relaxation training procedures; A-trait measures were impervious to variations in stimulus conditions. Correlations between A-trait measures were high and stable over time; correlations among A-state measures were moderate or negligible. Findings were interpreted as supporting the view that it is meaningful to posit state- and trait-anxiety as separate and distinct anxiety constructs.

388. Johnson, L. C., & Ulett, G. Stability of EEG activity and manifest anxiety. Journal of Comparative and Physiological Psychology, 1955, 52, 284-288.

In 44 young adults males, the resting EEG response over 24 frequencies, 3 to 33 cps, and the relationship of the EEG response to manifest anxiety were studied in three records taken over a nine-month period. All EEG activity was measured by an electronic analyzer, and judgment of manifest anxiety, ("subjective feelings" at the time of testing) was based on psychological test scores. There was significantly less EEG activity on Record 1 in all frequencies, but Records 2 and 3 were similar. The shape of the EEG response profiles was the same over all three records. The Ss with high manifest anxiety scores had significantly less EEG activity, especially in the 8 to 12-cps band, in Record 1, but there was no difference between the high and low manifest anxiety groups in the EEG response on Records 2 and 3. The manifest anxiety scores did not change over the three trials. These results were interpreted as demonstrating the importance of the interaction of the general anxiety level and the situation in which S finds himself as determinants of the EEG response.

389. Jones, H. E. The galvanic skin reflex as related to overt emotional expression. American Journal of Psychology, 1935, 47, 241-251.

"The object of the present study was to investigate the relation between overt and galvanic responses for various types and intensities of stimuli, presented under standard laboratory conditions." The S's were 86 pre-school children. Wechsler's galvanic apparatus with modifications was used. The situations were a buzzer, door-bell, color-mixer, white rat, etc. The tests were repeated for each S. The galvanic deflections (by split-half technique, corrected) yielded reliabilities of .84, .92, .93, and .97. Observational measures of overt responses gave reliabilities of .84, .94, .90, and .93. "It was found that the average galvanic deflection recorded for a given S gave little or no prediction of his average overt response. It was found that the average galvanic deflection recorded for a given stimulus agreed fairly closely with the average overt response recorded for that stimulus (correlations of the order of .80, for 22 stimuli). From the above, and from the consideration of case records, it was inferred that both sorts of data possessed an emotional significance; the misleading character of mass correlations was indicated, and the necessity of considering emotional relationships in terms of patterns of response in the individual case."

390. Jones, H. E. The study of patterns of emotional expression. In M. L. Reymert (Ed.), Feelings and emotions. New York: McGraw-Hill, 1950. Pp. 161-168.

The major finding of this study was:

The individual within a normal sample whose physiological reactions are markedly restricted in magnitude reminds one to some extent of Fenichel's concept of the "impulse neurotic," who is intolerant of tensions, who cannot postpone the attainment of goals, and who discharges tensions immediately by a generalized motor process reminiscent of mass activity in the infant. From some theoretical standpoints, it is reasonable to postulate that a frank and ready outgoing expressiveness helps to maintain good adjustment and that the socialized inhibition of overt responses tends to develop internal emotional tensions. Clinical experience yields many examples of this pattern of emotional organization. But the minor maladjustments to be found within our normal classroom samples appear much more likely to be associated with an extrovert expressive pattern and with restricted physiological reactions as indicated by the GSR.

391. Jones, H. E. & Wechsler, D. Galvanometric technique in studies of association. American Journal of Psychology, 1928, 40, 607-612.

1. In a serial association experiment, the magnitude of the psychogalvanic response varies with the temporal position of the stimulus. Hence, in clinical studies or in the detection of guilty knowledge, the emotional values of stimulus words cannot be compared without taking into account the factor of position in series. This of course might be inferred from the general experience with the rapid 'exhaustion' of the psychogalvanic response in repetitions of the same stimulus, but the application of the principle to association experiments has frequently been neglected. Such an error may account, in part, for the inconsistent results occasionally reported in the use of the psychogalvanic response.
2. 'Critical' and 'non-critical' words cannot readily be distinguished unless a preceding series of at least five buffer words has been used.
3. The importance of position is greater with 'non-critical' than with 'critical' words; stimuli connected with complexes yield reactions of considerable uniformity, regardless of where they occur.
4. If different Ss are to be compared as to emotivity, the schedule of presentation can be varied only within very narrow limits.
5. When reduced to a comparable scale, the median deflection values for each of the 16 words are closely similar to the results obtained by a previous experimenter. In terms of averages, this indicates a high degree of dependability of the psychogalvanic response.

392. Jordan, B. T., & Butler, J. R. GSR as a measure of the sexual component in hysteria. The Journal of Psychology, 1967, 67, 211-219.

Investigated the GSRs of Ss, with high scores, (T=65 or above) on the Hysteria (Hy) scale of the MMPI, to sexual stimuli, and the recall of such material. Results show that Ss with high Hy scores demonstrated a greater GSR while reading and recalling sexual passages, but no significant difference occurred in the recall of sexual detail by the Hy group as differentiated from the control group (all MMPI scales between Ts of 30 and 60).

393. Jordan, B. T., & Kempler, B. GSR and motor reactions to aversive stimuli as a function of sex and extroversion. Perceptual and Motor Skills, 1968, 26, 983-986.

In a classical conditioning paradigm a loud buzzer (UCS) was paired with colored light stimuli (CS). Ss were 16 neurotic introverts and 16 neurotic extroverts, with 8 male and 8 females in each group. GSR (CR) and gross motor activity were recorded throughout pre-conditioning, conditioning and extinction phases. There was a significant triple interaction for GSR among extroversion, sex, and conditioning; introverts showed a greater response than extroverts and male introverts greater than female introverts. Overt motor activity showed no relationship to the other variables.

394. Jordan, B. T., & Kempler, B. Hysterical personality: An experimental investigation of sex-role conflict. Journal of Abnormal Psychology, 1970, 75, 172-176.

Thirty-nine female hysterical personalities and 39 nonhysterics were selected with the hysterical personality (HP) measure. The Ss were divided into three groups receiving no threat, academic threat, and sex-role threat. Three measures were obtained: (a) galvanic skin response (GSR), (b) visual recognition thresholds for sexual and neutral phrases, and (c) personality ratings of male and female Es. Results showed that: (a) both types of threat produced heightened GSR for all Ss; (b) sex-role threat produced lower thresholds for sexual words among hysterics; and (c) hysterics' ratings were more positive for the male E compared with the female E under no threat, but reversed under threat conditions. It was concluded that anxiety over inadequacy and sex-role competency in particular are significant variables affecting the behavior of the hysterical personality.

395. Jost, H., Ruilmann, C. J., Hill, T. S., & Gulo, M. J. Studies in hypertension. I. Technics and control data. Central and autonomic nervous system reactions of normal adults to sensory and ideational (frustration) stimulation. Journal of Nervous and Mental Disease, 1952, 115, 35-48.

This is the first of a series of studies on the general problem of hypertension which aims at the development of measures for the evaluation of the hypertensive individual that will permit prediction of essential hypertension in early cases. The technics of the general study are described and the results of a study of a control group by means of electroencephalograph (CNS activity) and Keeler polygraph (ANS activity) data. Physiologic changes during physical and psychic stress give a fairly stable and reliable measure of the degree of emotional change during these periods. The relation of these changes to hypertension is discussed.

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396. Kahneman, D., & Peavler, W. S. Incentive effects and pupillary changes in association learning. Journal of Experimental Psychology, 1969, 79, 312-318.

Pupillary measurements were obtained for 10 Ss during a learning task. On a trial, eight digit noun pairs were presented aurally for immediate recall. The digit, even or odd, determined the monetary incentive for retaining the pair. The same nouns were paired to the digits 2-9 for eight trials with a different pairing on every trial. High-reward (HR) items were learned more often than low-reward (LR) items, and occasioned larger pupillary dilations following the presentation of the response noun. Within an incentive class, pupil responses at study did not predict recall. The differential pupil response of Ss to HR and LR items corresponded closely to a behavioral index of preference for HR items.

397. Kahneman, D., Peavler, W. S., & Onuska, L. Effects of verbalization and incentive on the pupil response to mental activity. Canadian Journal of Psychology, 1969, 22, 186-196.

Measurements of pupil size were obtained during performance of a short-term memory task (Add-0) and a digit-transformation task (Add-1). In Experiment I, Ss either repeated their answer twice (say) or thought the answer first then said it aloud once (think). Small dilations occur on the first utterance of a digit string. In Experiment II, the risk associated with the task was varied by monetary incentive and penalty. High incentive only increases the pupil response to the easier task. In both experiments the largest effects were associated with task difficulty. The results confirm the validity of pupil measures as indicators of the load imposed by mental activity.

398. Kaplan, H. B. Social interaction and GSR activity during group psychotherapy. Psychosomatic Medicine, 1963, 25, 140-145.

In an interpretation of the group therapy situation as a complex stimulus field, 37 therapy sessions were studied with reference to the nature of the association between a physiological parameter (GSR) and dimensions of social interaction.

The group, consisting of a nurse-therapist and two schizophrenic patients, was observed and coded in terms of 11 social categories.

The social behavior of the group and its component members was correlated with the continuous and synchronous GSR recordings, using the total session as the varying unit.

The GSR was interpreted as an index of meaningfulness (affective response and level of adaptive mobilization) and was variously and significantly associated with parameters of social interaction depending upon the subject's position in the group, her stated areas of concern and the nature of the individual relationships as they developed in the group.

399. Kaplan, H. B. Physiological correlates (GSR) of affect in small groups. Journal of Psychosomatic Research, 1967, 11, 173-179.

The present study investigated the relationship between physiological response, participation rank and affective-response rank in two four-man groups of medical students characterized by different sociometric composition: a negative group in which each person was disliked by one other person; and a positive group in which each person was liked by every other person.

The groups met for five sessions to discuss topics known to be of the interest to medical students. Sound film recordings of the sessions were coded in terms of Bales interaction process categories. Continuous and synchronous GSR recordings were made for each subject.

Participation rank was defined in terms of total response; and affective, positive-affective and negative-affective acts were defined in terms of the rank ordering of proportion of the subject's acts that were affective, positive or negative respectively relative to the other subjects.

In the negative group, participation was positively related to affective behaviour. Subjects were more likely to manifest significant, positive GSR correlations with their own behaviour if they were high participators and high positive-affective responders and when addressing high participators and high negative-affective responders. This suggests the presence of an integrative role and perhaps a covert competition among leaders, the significance of which is reflected in GSR activity. Low participators tended to express themselves primarily in terms of instrumental activity with relatively little covariation between their GSR and social activity.

In the positive group, participation was inversely associated with affective activity. Subjects were more likely to manifest covariation between GSR and social behaviour if they were high negative-affective responders and low participators and when acting toward high participators and low negative-affective (high instrumental) responders. This suggests the presence of a deviant status which is associated with GSR activity as a result of the pressures toward uniformity experienced by the occupants of the status.

400. Kaplan, H. B., & Bloom, S. W. The use of sociological and social-psychological concepts in physiological research: A review of selected experimental studies. Journal of Nervous and Mental Disease, 1960, 130, 128-134.

The relationship between social behavior and intra-psychic processes has been well documented, as has the relationship between the latter and physiological activity. However, the conclusion of this "syllogism," the relationship between social behavior and physiological processes, has not been sufficiently emphasized heretofore. This is not to assert that this relationship is not mediated by psychological processes, but rather that for certain purposes the relationship between the social and physiological levels, holding the psychological dimension constant, may be directly investigated thus providing data of value to both of the co-operating disciplines, physiology and sociology.

401. Kaplan, H. B., Burch, N. R., Bedner, T. D., & Trenda, J. D. Physiologic (GSR) activity and perceptions of social behavior in positive, negative and neutral pairs. Journal of Nervous and Mental Disease, 1965, 140, 457-463.

The present study investigated the relationship between physiologic (GSR) responses and perceptions of social behavior in sociometrically determined positive, negative and neutral pairs. It was expected that in each of the three groupings the members would experience different interactional problems, and that the perceptions relating to these problems would be reflected in the association between the physiologic responses and the descriptions of social behavior by the pair members. In general, the hypothesis was supported.

Interpretation of results suggested that among the negative pairs, high GSR activity was associated with the members' self-other descriptions relating to expression of negative (as opposed to positive) affect; for the positive pairs, high GSR activity was associated with descriptions relating to disruption of the task process (presumably by expressive positive socio-emotional activity); for neutral pairs, high GSR levels were associated with descriptions relating to resistance to active attempts at interpersonal influence (as opposed to passive mutual withdrawal).

402. Kaplan, H. B., Burch, N. R., & Bloom, S. W. Physiological covariation and sociometric relationships in small peer groups. In P. H. Leiderman & D. Shapiro (Eds.), Psychobiological approaches in social behavior. Stanford: Stanford University Press, 1964. Pp. 92-109.

This chapter describes the results of two studies of the effects of personal interactions upon the galvanic skin reflex (GSR).

Sound film recordings of group discussions were coded in terms of Bales' interaction process categories.

Study 1 hypothesizes that groups with strong affective orientation between members will show covariation of affective response reflected in the GSR activity.

Study two's purpose was to determine if a relationship existed among physiological covariations, sociometric evaluations and the subjects' perception of their own (and their partners') social behavior.

While negative-pair members were significantly more likely to manifest physiological covariation than positive-pair members, there was no significant difference between them with respect either to proportion of acts that were overtly negative (Study 1) or to subjects' perceptions of "eagerness and aggression" (Study 2).

403. Kaplan, H. B., Burch, N. R., Bloom, S. W., & Edelberg, R. Affective orientation and physiological activity (GSR) in small peer groups. Psychosomatic Medicine, 1963, 25, 245-252.

The relationships that comprise small groups of peers present to the participants a web of interpersonal attractions, repulsions, and indifferences. In the present investigation it was hypothesized that, when a strong affective orientation (positive or negative) exists between members of a group, the affective response of these members to the pattern of interpersonal activity in the group will covary, and this covariation of affective response will be reflected in the covariation of their autonomic (GSR) activity.

The data collected from three 4-man groups, each of which met for five sessions, were analyzed on the basis of the affective tone (positive, negative, neutral) of the groups' component relationships. They indicated that: physiological covariation was more likely to occur among members of sociometrically determined positive and negative pairs than among neutral pair members: subjects' GSR activity was associated with their own social behavior when it was directed to positive or negative social objects to a greater extent than when directed toward neutral social objects; the latter relationship held for socioemotional behavior but not for instrumental activity or total activity.

404. Karlin, L. Cognition, preparation, and sensory-evoked potentials. Psychological Bulletin, 1970, 73, 122-136.

Experiments reporting enhancement of averaged sensory-evoked potentials resulting from the effects of various cognitive aspects of stimulation are reviewed and reinterpreted in terms of two hypotheses which refer, respectively, to (a) development of preparation before and (b) reactive change in preparation after presentation of critical stimuli. The possibility is examined that certain slow voltage changes, such as contingent negative variation and other so-called "readiness" potentials, are associated with reactive change and produce the positive enhancement in evoked potentials as reported in many of these experiments.

405. Katkin, E. S. Relationship between manifest anxiety and two indices of autonomic response to stress. Journal of Personality and Social Psychology, 1965, 2, 324-333.

The effects of stress (threat of shock) on basal skin resistance and GSR non-specific responses were investigated for Ss who differed in anxiety levels on the Taylor Manifest Anxiety scale. Twenty-six high-anxious (HA) and 26 low-anxious (LA) Ss were randomly assigned to stress and nonstress conditions, yielding 4 groups. First, all Ss rested; then both stress groups were threatened with electric shock, while both nonstress groups continued resting; finally, all Ss rested again. During the 2nd period GSR nonspecifics increased and basal resistance decreased for the shock-threat groups only, as expected; however, during the final period (after a 15-min. interview) GSR nonspecifics decreased to the prethreat level for the shock-threat groups, but basal resistance continued to decrease for all Ss. Both GSR indices were unrelated to individual differences in anxiety level. It was concluded that the 2 GSR indices reflect different phenomena.

406. Katkin, E. S. The relationship between a measure of transitory anxiety and spontaneous autonomic activity. Journal of Abnormal Psychology, 1966, 71, 142-146.

The effects of stress (threat of shock) on GSR nonspecific responses were evaluated for Ss who differed in transitory anxiety as measured by the Affect Adjective Check List (AACL). Fifty-two Ss were equally divided among 4 groups. Hi AACL Stress, Lo AACL Stress, Hi AACL Nonstress, and Lo AACL Nonstress. First, all Ss rested; then both Stress groups were threatened with shock, while both Nonstress groups continued resting; finally, all Ss rested again. During the 2nd period GSR nonspecifics increased for both stress groups; however, during the final period, after the cessation of stress, GSR nonspecifics decreased more for the Lo AACL Ss than for the Hi AACL Ss. It was concluded that the AACL may be related to "autonomic recovery rate."

407. Katz, H., Cadoret, R. J., Hughes, K. R., & Abbey, D. S. Physiological correlates of acceptable and unacceptable attitude statements. Psychological Reports, 1965, 17, 78.

Twenty S's were given 5 acceptable statements (A) and 5 unacceptable statements (U) which expressed their extreme views on the Golightly and Byrne's 41-item survey. Half of the 10 items were also phrased neutrally (N). Stimuli were presented on cards while GSR and heart-rate responses were recorded. Both A and U statements aroused physiological responses on both of two trials. U statements were differentiated significantly from A statements by intensity of responses (GSR increase and decrease).

408. Kelly, D., & Martin, I. Autonomic reactivity, eyelid conditioning and their relationship to neuroticism and extraversion. Behavioral Research and Therapy, 1969, 7, 233-244.

No evidence was found to support the hypothesis that neurotic patients demonstrate over-reactivity of the autonomic nervous system in response to stressful stimuli, or that introverts and extraverts are characterized by ease and difficulty respectively with which they form conditioned responses. Normal controls, instead of showing the least autonomic reactivity as postulated, showed the greatest. The difficulties of measuring autonomic reactivity in relation to pre-stress levels are discussed and in view of these problems the conclusions are interpreted with caution.

Factor analysis of the data yielded a primary Anxiety/Neuroticism factor, which had high loadings for 'basal' forearm blood flow and heart rate which are thought to reflect anxiety. There was a close relationship between N and Taylor Scale anxiety scores and it is suggested that Eysenck's N scale is close to the clinical concept of anxiety. Data is reported correlating autonomic activity with extraversion and neuroticism.

409. Kelly, D. H. W., & Walter, C. J. S. The relationship between clinical diagnosis and anxiety, assessed by forearm blood flow and other measurements. British Journal of Psychiatry, 1968, 114, 611-626.

Measurements of forearm blood flow, heart rate, and anxiety self-rating were made during rest and under stress produced by mental arithmetic for 20 controls and 21 anxious patients. Anxious Ss showed much greater resting blood flow than did controls. A significant correlation between this flow and the Taylor MA scale, anxiety self-rating, and heart rate was found. Chronic schizophrenics were similar to anxiety cases when resting, but showed a different and poorer response to stress. Nonagitated depressives were similar to normals in resting blood flow, but when anxiety was noted clinically, higher blood flow and anxiety ratings were found. Mean blood flow and anxiety ratings were low for hysterics during both rest and stress. It is concluded that anxiety measurement is a valuable clinical tool.

410. Kennard, M. A., Rabinovich, M. S., Schwartzman, A. E., & Fister, W. P. Factor of aggression as related to the electroencephalogram. Diseases of the Nervous System, 1956, 17, 3-7.

In a study of the relationship of personality structure to electroencephalographic characteristics, the factor of aggression or of low frustration threshold has been examined in 192 young individuals from (1) a mental hospital, (2) a prison colony and (3) a normal control group, with the following results:

1. Hostility or "acting-out aggression" appears to be positively related to EEG theta activity in this study as in previous ones of other investigators.
 2. Both hostility and EEG theta activity show a positive correlation with a high and therefore abnormal score on the Bender-Gestalt test.
 3. Clinical diagnoses and data from other psychological tests, notably the Rorschach, indicate that the factor of low frustration level is part of a generalized relatively unstable, fluctuant and severely disturbed personality, and that the EEG patterns of this group is similarly fluctuant, unstable, and poorly organized as compared with that of the normal controls and of the psychopaths who are relatively stable with respect to their environment.
411. Kennard, M. A., & Schwartzman, A. E. A longitudinal study of changes in EEG frequency pattern as related to psychological changes. Journal of Nervous and Mental Disease, 1956, 124, 8-20.
1. Observations of frequency pattern of EEGs and comparison with psychological data in a longitudinal study of patients over a period of several months have confirmed the previously recognized fact that EEG frequency pattern is related to psychological function.
 2. Previous observations that such factors as anxiety and aggression can be correlated with type of EEG pattern have been confirmed.
 3. A comparison of the extremes of EEG frequency characteristics now shows that these relate, on the one hand, to the pattern of personality exhibited by the severe schizophrenics and, at the other extreme, to that of the psychopath as defined in this paper.
 4. The above observations have been shown to fit with the data obtained by others in relation to the normal EEG pattern.

5. It can therefore be postulated that over-all EEG pattern can be altered in such a way as to deviate from normal frequency relationships by the stresses of situations. It may be assumed from the data that this alteration is to some extent reversible. It is also related to basic and inherent EEG pattern and to the original stability of its organization.

412. Kermani, E. J. "Aggression": Biophysiological aspects. Diseases of the Nervous System, 1969, 30, 407-414.

Explored the relationship of the amygdala, hypothalamus, and midbrain to hostile aggression and destructive behavior. A study of EEGs showed that some people with aggressiveness have some abnormality in EEG patterns characterized by "theta" activity and "burst of spike." It was also found that aggression can be produced by the technique of classical Pavlovian conditioning. Recent biological studies indicate that there is a sharp fall of noradrenaline in the lower brainstem after animals become aggressive. The relationship between the testosterone and aggression was discussed and it was found that testosterone in males and to a lesser degree estradiol in females are important in the production of aggression. The relationship between such psychosomatic disorders as hypertension, asthma, and peptic ulcer with aggression was discussed. A review on the genetic aspect of aggression shows that men with an extra Y chromosome have a greater tendency to become antisocial.

413. King, S. H., & Funkenstein, D. H. Religious practice and cardiovascular reactions during stress. Journal of Abnormal and Social Psychology, 1957, 55, 135-137.

These data when combined with those on which we have reported previously indicate that there is a constellation of psychological and sociological factors which are associated with the cardiovascular reactions of healthy Ss in acute stress. This constellation includes the S's immediate emotional reaction, his attitudes in the area of religious values, his perception of parental behavior in discipline, and the churchgoing behavior of his parents. The Ss who responded to acute stress with a nor-epinephrine-like cardiovascular reaction tended to also respond with anger directed at the E. In addition, they were individuals who perceived their father as the principal disciplinarian in the family and stern in his discipline, they had conservative attitudes in the area of religious faith and belief, and they came from families where the church attendance habits were regular. On the other hand, those Ss who responded to acute stress with an epinephrine-like reaction tended to respond with anger directed against themselves or anxiety. In addition, they perceived their fathers as non-dominant in discipline, had moderate to liberal attitudes in the area of religious faith and belief, and came from families where the pattern of church attendance was occasional or infrequent.

414. Kissel, S. Stress-reducing properties of social stimuli. Journal of Personality and Social Psychology, 1965, 2, 378-384.

Previous research has suggested that stress induces motivation to be with other people. The present study was designed to examine experimentally the effect on stress of being with other people. Hypotheses tested were: The presence of another person in a stressful situation reduces stress, the presence of a friend in a stressful situation reduces stress more than the presence of a stranger, and stressful individuals with strong affiliation motivation show more stress reduction than those with weak affiliation motivation in the presence of another person. In a stressful situation, stress responses were lower in the presence of another person, if he was a friend. The presence of a friend reduced the stressfulness of the situation more than the presence of a stranger. Affiliation motivation was found not to be significantly related to social stimuli as stress reducers. The GSR was employed as a measure of stress.

415. Kleiman, J. A. Skin conductance, somatic relaxation, and psychological threat: A laboratory analog of reciprocal inhibition. (Doctoral dissertation, Temple University) Ann Arbor, Mich.: University Microfilms, 1968. No. 68-14,140.

The purpose of this experiment was to provide a laboratory analog of Wolpe's reciprocal inhibition model. It attempted to demonstrate whether autonomic arousal could be reduced as a function of induced relaxation in face of mildly threatening stimuli. The utility of electrodermal variables in relaxation assessment was explored as were relationships between phenomenological reports of arousal and physiologic response systems. Finally, the relative contributions of verbal suggestion and active muscle contraction to the relaxation process were investigated.

Three groups of student nurse volunteers (N = 15) were randomly established. One group received a relaxation experience patterned after Jacobson's technique (JG). The second received verbal suggestions of relaxation (SG). A control group completed a non-arousing interest inventory (CG).

In a repeated measures design, pre- and post-treatment threat were established by requiring S to repeat affectively charged words in the presence of a male E.

It was specifically hypothesized that decreased organismic activation, as a function of induced relaxation, would be reflected in concomitant reductions in basal skin conductance. Considered jointly, both relaxation groups were significantly different from CG at below the .05 level.

Exploratory analyses of corresponding relaxation ratings generated identical conclusions.

Exploration of self-report data yielded findings which directly paralleled the results of the GSR analysis.

It was also predicted that charged words would elicit greater GSRs than neutral words. This hypothesis was supported at less than the .001 level. While it was further predicted that responses to charged words would be more effectively reduced than responses to neutral words, limitations of the data precluded any confident conclusions.

416. Korchin, S. J., & Herz, M. Differential effects of "shame and disintegrative" threats on emotional and adrenocortical functioning. A.M.A. Archives of General Psychiatry, 1960, 2, 640-652.

An experimental task intended as a shame threat (Scrambled Sentences) and another designed as a disintegrative threat (Picture Description) were administered to comparable groups of healthy young men on the second of two experimental days. Plasma hydrocortisone levels were found to be significantly elevated at the time of first measurement, yielding further evidence of the impact of a novel situation on adrenocortical activity, even in the absence of intended stress. Before-to-after measures made on the stress day indicate both adrenocortical and emotional response to both experimental conditions. However, there are important differences between the two conditions: Subjects exposed to the disintegrative procedure showed proportionately more corticoid and proportionately less affective response, while those in the shame condition had relatively less corticoid and relatively more affective response. Possible interpretations of these patterns are discussed in terms of the psychological qualities in each type of threat for evoking emotional and defensive behavior. The findings are taken as evidence of the need for distinguishing the various aspects of the stress experience -- the threatening situation, the affective response, physiological or behavior change -- and to consider the precise ways in which they are interrelated, rather than to assume any simple or direct relations among them.

417. Kostandov, E. A. Vliyanie otritsatel'nykh emotsii na vospriyatie u psikhopatov. (Influence of negative emotions on perception in psychopaths.) Zhurnal Nevropatologii i Psikiatrii, 1970, 70, 225-235.

The 20-45 year old Ss included 22 excitable psychopaths, 10 psychopaths with ideas of superiority of nonpathological character, six psychopaths with paranoid development, and 22 normal individuals. It was shown that, under emotional excitation, part of the stimuli from the external environment, previously perceived, receded from awareness, but could nevertheless, act on the organism on the subsensory level. The influence of negative emotions on the processes of perception were more prolonged in psychopaths than in normal Ss. In psychopaths the threshold of recognition of "emotional" words, having to do with their conflictful life situation, could be decidedly lower or higher than that of "neutral" words. In cases of increased threshold of recognition, a subthreshold effect of the emotional word was recorded in the form of bioelectrical and autonomic reactions. The possible role of these changes in perception in the behavior of psychopathic personalities is discussed.

418. Krugman, H. E. A comparison of physical and verbal responses to television commercials. Public Opinion Quarterly, 1965, 29, 323-325.

Verbal measures of interest were less reliable than verbal measures of conviction. The former were much influenced by order of presentation; each commercial was favored by later exposure, so that differences between the two commercials were obscured. Physical measurement of interest also showed the effect of order of presentation, but with later exposure highlighting the differences between the 2 commercials. In measuring liking for, or interest in, television commercials the use of an immediate physical response such as pupil size involves less bias than a later verbal response. Verbal measures of conviction are unrelated to measures of liking and do not appear to have the same shortcomings.

419. Krugman, H. E. Processes underlying exposure to advertising. American Psychologist, 1968, 23, 245-253.

Explores ongoing processes during moments of exposure. 3 kinds of data are reported. Thinking is defined as thoughts coming spontaneously to mind while viewing. Looking is defined in terms of a stand mounted eye movement recorder (Mackworth Optiscan). Feeling is defined in terms of intensity of response as measured by pupil size (Hess apparatus). Test ads elicited much subjective response. Ads with the least structure elicited the most thoughts per respondent, the widest variety of thoughts and the most thoughts expressing desire for the product and service. Highly structured ads were most informative, least motivating or persuasive, i.e., information is not simply persuasive. Ads which were easily learned required little of the respondent, and communicated with little work on his part: but ads which were not learned easily required the respondent to be more active, i.e., to scan rather than focus. The work of communication may therefore be done by the communicator via creation of an easily learnable ad, or by the respondent via an ability to learn difficult communiques. Communication is further discussed, considering differences between familiar and novel stimuli, and related cognitive problems, and the required number of trials. The study of effects of completed communication is proposed.

420. Kuechenmeister, C. A., Hain, J. D., & McClusky, H. Y. Contingent computer averaging of evoked heart rate response to visual stimuli. Paper presented at the 23rd Annual Conference on Engineering in Medicine and Biology, Washington D. C., January 1970.

The technique of signal averaging to recover repetitive time-locked signals from background noise has been used successfully for a number of years. The purpose of this paper is to demonstrate that signal averaging may be utilized to identify patterns of evoked heart rate response to emotion provoking visual stimuli. Results indicate that different kinds of emotion are identified by heart rate response.

421. Kugelmass, S., & Liebllich, I. An analysis of mechanisms underlying psychophysiological detection. Washington, D. C., Government Publication Office, 1964. Hearing before the Subcommittee of the Committee on Federal Government Operations, on the Use of Polygraph as "Lie Detector", Part 3, Panel Discussion with Scientists.

This report discusses experimental work where laboratory detection techniques (card detection paradigm) are assessed in high stress situations (subjects were suspected of serious criminal offenses) and the efficacy of combining physiological responses to aid detection. Results support, "the claim of high GSR discriminatory efficiency under stress", and indicate that a slight increase in detection rate was obtained by combining variables.

422. Kugelmass, S., & Liebllich, I. Effects of realistic stress and procedural interference in experimental lie detection. Journal of Applied Psychology, 1966, 50, 211-216.

Two different samples of police trainees were used to investigate: (a) the effect of realistic stress in experimental lie detection, (b) the possible interference with the GSR channel resulting from the simultaneous recording of blood pressure. It was found that: (a) GSR detection results under stress were essentially similar to those obtained in mild experimental situations, and far superior in detection efficiency to analysis of heart rate changes. (b) The introduction of a blood-pressure cuff inflated to 80 mm. Hg for the 90 sec. of interrogation (similar to actual field measurement conditions) reduced the efficiency of detection of the GSR channel. (c) There is some suggestion that GSR reactivity may be related to ethnic origin.

423. Kugelmass, S., & Liebllich, I. Relation between ethnic origin and GSR reactivity in psychophysiological detection. Journal of Applied Psychology, 1968, 52, 158-162.

The psychophysiological data of 3 Jewish and 1 Bedouin samples were analyzed in connection with the detectability of a previously chosen card. Ss of Near Eastern origin tended to show lower pulse rate, higher basic skin conductance, and lower relevant GSR reactivity. It is proposed that psychocultural differences are likely to be the explanation for the consistent differential GSR reactivity to the relevant stimuli.

424. Kugelmass, S., Lieblich, I., Ben-Ishai, A., Opatowski, A., & Kaplan, M. Experimental evaluation of galvanic skin response and blood pressure change indices during criminal interrogation. Journal of Criminal Law, Criminology and Police Science, 1968, 59, 632-635.

Police authorities have felt that GSR is of little value in lie detection, while laboratory studies have found it successful. The difference may be interrogation stress vs. the lack of it in the laboratory. Also the interrogation use of the blood pressure cuff is generally not used in laboratories. Sixty-two criminal suspects were naive Ss. A card test was used. Cuff and noncuff conditions were set up. GSR under both cuff and noncuff and blood pressure were all equally statistically useful indicators. Results were slightly better than in a comparable nonstress study. It may be that there is an interaction between interference of a cuff on effectiveness of GSR and presence or absence of stress.

425. Kugelmass, S., Lieblich, I., & Bergman, Z. The role of "Lying" in psychophysiological detection. Psychophysiology, 1967, 3, 312-315.

An experiment was designed to examine the role of lying behavior, per se, as the basis for experimental psychophysiological detection of deception. In addition to the standard card-test procedure, a second procedure required the S to say "yes" to every question posed relating to the card chosen. This variation involved telling the "truth" in respect to the critical card in contrast to the usual procedure in which he is required to "lie". With the use of the galvanic skin responses (GSR) channel, significant detection rates were obtained for both procedures with no significant difference between them. Some theoretical issues related to the findings were explored.

426. Lacey, J. I. Psychophysiological approaches to the evaluation of psychotherapeutic process and outcome. In E. A. Rubinstein & M. B. Parloff (Eds.), Research in psychotherapy. Vol. I. Washington, D. C.: American Psychological Association, 1959. Pp. 160-208.

This article reviews the literature that relates psychophysiological changes to such variables as: conflict, threat, frustration, anxiety, anger, fear, startle, pain, embarrassment, and pleasant and unpleasant stimuli. As a result of the review the following recommendations are made concerning the use of autonomic measures as indicator functions: (1) Clear distinctions should be made among three dimensions of autonomic activity, namely, tension, lability, and spontaneous activity; (2) Appropriate and defensible mathematical techniques must be used in arriving at measures of lability. Simple difference or percentage measure of change are rarely, if ever, defensible. This topic has been touched upon only lightly in this paper. It is discussed in detail elsewhere. (3) One measure of somatic "arousal" cannot serve as an index to the state of other measures. Even at best, the intercorrelations among autonomic measures is low. (4) So far as present evidence goes, individual indicant concordance is so low that single autonomic measures cannot be used to unequivocally rank-order the "arousal-value" of different stimuli for a given individual, or the "arousability" of different individuals.

427. Lacey, J., Kagan, J., Lacey, B. G., & Moss, H. A. The visceral level: Situational determinants and behavioral correlates of autonomic response patterns. In P. K. Knapp (Ed.), Expressions of the emotions in man. New York: International Universities Press, 1963. Pp. 161-196.

The studies discussed in this article deal with physiological correlates of situations in which S is assumed to want to accept the external environment, reject the external environment as well as situations in which subject involvement is assumed to have played a crucial role.

428. Lacey, J. I., & Smith, R. L. Conditioning and generalization of unconscious anxiety. Science, 1954, 120, 1045-1052.

In this preliminary investigation, Diven's technique was modified in five particulars: (i) each subject was his own control; (ii) the physiological records were so read as to study clearly only conditioned anticipatory effects; (iii) the technique of physiological measurement controlled for individual differences in overall reactivity and for varying base levels; (iv) both conditioning and generalization were studied as a systematic function of the number of reinforcements; and (v) the task presented to the subjects was modified in an important fashion in that only one group of words, the rural words, cohered by virtue of common meaning. The nonrural words formed a group only by exclusion from the rural class.

Although not all the statistical comparisons reached satisfactory confidence levels, it seems clear that we may conclude that, if a word-sign becomes the signal for a painful stimulus, without the subject being able to verbalize this relationship, an anticipatory autonomic response will ensue. This unconsciously formed anxiety reaction; moreover, will appear to other word-signs meaningfully related to the conditioned word.

429. Lader, M. H. Palmar skin conductance measures in anxiety and phobic states. Journal of Psychosomatic Research, 1967, 11, 271-281.

Physiological and clinical studies were carried out on 99 patients comprising five groups--anxiety-with-depression, anxiety state, agoraphobia, social phobia and specific monosymptomatic phobia. The physiological study consisted of a standardized laboratory procedure in which the palmar skin conductance was recorded during the presentation of 20 identical 1 kHz auditory stimuli of 100 dB intensity and one sec. duration applied at intervals of 45-80 sec. Measures derived included the rate of habituation of the GSR's and the number of spontaneous skin conductance fluctuations. Clinical variables rated included levels of general and situational anxiety, assessments of overt anxiety, frequency of panic attacks and response to treatment with sedatives.

General anxiety levels were lower in specific phobics and higher in anxiety states than the other 3 groups. Situational anxiety was more marked in the three phobic groups who tended also to show most social disability. Overt anxiety was lower in the specific phobics than the other 4 groups.

430. Lakie, W. L. Relationship of galvanic skin response to task difficulty, personality traits, and motivation. Research Quarterly, 1967, 38, 58-63.

Concerned with the relation of GSR to task difficulty, feeling and emotion, and to motivation. Each of the 39 Ss was asked to make 4 contractions on a hand dynamometer of specific kilograms, calculated to be 50, 70, 90, and 110% of his maximal contraction. Ss were categorized by scores on each of the 3 personality measures, and 2 subgroups were defined on the basis of scores on the n Ach (French Test of Insight) and the Neuroticism (n) scale of the MPI. The conclusions were that task difficulty is reflected in GSR scores, with the more difficult task associated with a greater rise in GSR; that Ss dichotomized by their scores on each of 3 personality scales cannot be differentiated by GSR scores; and that Ss scoring high on n Ach and low on the N scale had higher mean GSR scores than Ss scoring high on the N scale and low on n Ach.

431. Landis, C. Psychology and the psychogalvanic reflex. Psychological Review, 1930, 37, 381-398.

In any attempt to evaluate the psychogalvanic reflex as a device of psychological importance (i.e., as indicator of apprehension, emotion, etc.) certain empirical facts must be kept in mind. (1) It has been demonstrated that the reflex is under the control of the sympathetic division of the autonomic nervous system. The center of this control is found to be localized in or near the calamus scriptorius. Kuntz gives evidence which indicates that the fibres of the sympathetic nervous system running to the sweat glands of the skin are not overly specific in their action, nor do they necessarily follow the usual laws governing other types of sympathetic nervous activity. (2) The reflex is associated with the secretion of sweat, with vaso-motor changes, changes in the pilo-motor musculature, and probably with changes in the pH of the blood or lymph of the skin. (3) The reflex may, and frequently does appear as a concomitant to any one of the above list of physiological changes. That is to say, it is not necessary for all of these physiological changes to occur in order that the galvanic reflex should be elicited.

432. Landis, C. Electrical phenomena of the skin (galvanic skin response). Psychological Bulletin, 1932, 29, 693-752.

Two hundred sixty-four titles are reviewed rather fully and critically under these heads: historical; methodology--circuits, galvanometers, electrodes; physical nature of the phenomena; physical factors influencing these phenomena; underlying anatomical factors; physiological nature of the response -- general condition of the body, physiological processes changing the responses; psychological significance; applications -- clinical, individual differences, association, conditioning, comparison with other psychological measurements; miscellaneous -- hypnosis, the response in children, in animals. "The reviewer is convinced that there is really no adequate evidence that these electrical phenomena of the skin are of necessity associated with any psychological event."

433. Landis, C., & DeWick, H. N. The electrical phenomena of the skin (psychogalvanic reflex). Psychological Bulletin, 1929, 26, 64-119.

An inclusive review of 301 titles, covering work on the phenomenon, under the headings; history, methodology, physical nature of the psychogalvanic reflex, its anatomy, its physiological nature, its psychological study, its applications, and miscellaneous topics. .

434. Landis, C., & Gullette, R. Studies of emotional reactions III. Systolic blood pressure and inspiration-expiration ratios. Journal of Comparative Psychology, 1925, 5, 221-253.

A detailed study was made of the systolic blood pressure of 25 subjects during marked emotional disturbance. Partial records of the I/E ratios during the same disturbance were also made. Analysis of these data shows the following:

1. Studies of systolic blood-pressure records taken over periods of 15 to 120 minutes in unemotional situations reveal that although the general level is rather constant, changes of 8 to 10 mm. within a minute are common while changes of as high as 18 to 20 mm. in a minute may occur.
 2. No classification of change in blood pressure during unemotional conditions, such as range, variability, etc., offers prediction value for such reactions in emotional situations.
 3. General trends of pressure changes for individuals do not exist; that is, there are no types of individual blood pressure reactions.
 4. Sudden, unexpected stimulation (surprise) gave the only type of vascular reaction which shows pattern. In this case there is a sharp rise followed by an immediate fall.
 5. Range, increase or decrease of pressure, variability, etc., are not dependent upon the stimulation but upon the physiological condition of the organism at the time of stimulation.
 6. A basis of blood-pressure differentiation between truth and falsehood, in the group studied, was not found.
 7. Blood pressure offers no part to the "upset" following emotional disturbance, since it returns to normal very quickly after stimulation ends.
 8. No pattern of reaction, bearing a one to one correlation with the introspection of the feeling, was found.
 9. Sex excitement, surprise, and fear were usually accompanied by a rise in pressure. Anger and disgust show on the average, practically no change. These are regarded as chance findings.
435. Landis, C., & Hunt, W. A. The conscious correlates of the skin response. Journal of Experimental Psychology, 1935, 18, 505-528.

In summary, a group of observers differing widely in psychological experience and systematic bias and including some psychopathic cases were submitted to a wide range of stimulus situations while their galvanic skin response were being measured. They were asked to introspect on the conscious experiences accompanying these stimuli. The results show that the galvanic skin response accompanies all the types of stimuli used and all the types of conscious content reported. Relative quantitative differences do exist, however, and we find emotion consistently high, both in the number of deflections occurring with it and in the size of the deflections. It is suggested that these results be interpreted in terms of the participation of the sympathetic division of the autonomic nervous system.

436. Landis, C., & Slight, D. Studies of emotional reactions VI. Cardiac responses. Journal of General Psychology, 1929, 2, 413-418.

This experiment was designed to study the relationship between the emotional experience of surprise and the activity of the heart as shown in the electrocardiogram. The following points have been brought out:

- i. "Surprise" stimulation causes changes in form in the electrocardiogram of a variety of types. In all ten normal subjects some variation resulted, but in none of five cases of melancholia and in only two of seven cases of dementia praecox.
2. When the stimulation occurred near the mid-point of the P-T or the T-P intervals of the pulse wave, there was a tendency towards subsequent change in the electrocardiogram.
3. In 39 records the T-P interval showed a greater change than the P-T, subsequent to stimulation; in 12 records the change was more marked in the P-T, although only slightly so; in 23 records there was not enough difference to make a distinction.
4. After stimulation, an alteration in the P-T/T-P ratio was manifest in two-thirds of the records of normals and anxiety states, but in only one-third of those of melancholic, post-encephalitic, and dementia praecox subjects.
5. Records of respiration did not show the alteration recorded by other observers as a result of sudden stimulation. The respiratory changes noted showed no relationship to other factors studied.

437. Lang, P. J. Fear-reduction and fear behavior: Problems in treating a construct. Research in Psychotherapy, 1968, 3, 90-102.

It was assumed that fear is a response, and further that it is a response expressed in three main behavioral systems: verbal (cognitive), overt-motor, and somatic. For the purposes of measurement, none of these systems is held to be primary or to hold a special controlling relationship to the others. While the most prevalent theories and the evidence of phenomenal experience argue that the main therapeutic effort should concern the alteration of cognitions or implicit verbal behavior--and the measurement corollary would hold that reports of feelings, changes in attitude are the primary outputs to be assessed--we suspended such judgement for our research. Furthermore, we did not assume that the physiological changes of the subject constituted the only valid measure of emotional behavior (like the operator of a police polygraph who assumes that truth resides in the autonomic nervous system), nor did we hold that the overt-motor responses of the subject (the traditional stuff of experimental psychology) had special validity in the assessment of emotional behavior. We simply tried to sample behavior in all three systems described, and objectively assess the change observed.

438. Lang, P. J. The mechanics of desensitization and the laboratory study of human fear. In C. M. Franks (Ed.), Behavior therapy: Appraisal and status. New York: McGraw-Hill, 1969 Pp. 160-191.

Although the main focus of this paper is on desensitization, a great deal of material is presented relating autonomic response to fear arousing objects. The exposure to these threatening stimuli varied from asking S to imagine them, through showing S films about the item, to actual confrontation with the object (e.g., picking up a snake).

439. Lang, P. J. Stimulus control, response control, and the desensitization of fear. In D. J. Levis (Ed.), Learning approaches to therapeutic behavior. Chicago: Aldine Publishing Company, in press.

The main focus of this review is on desensitization techniques. A large portion of the report, however, describes work where autonomic responses are related to filmed phobic material, subjects' rating of the filmed material for fearfulness, and pre- and post questionnaires designed to evaluate subjects' degree of fear of the particular object depicted in the filmed material.

440. Lang, P. J., Melamed, B. G., & Hart, J. A psychophysiological analysis of fear modification using an automated desensitization procedure. Journal of Abnormal Psychology, 1970, 76, 220-234.

In the first experiment, an apparatus designed to administer systematic desensitization automatically was as effective as a live therapist in reducing phobic behavior, suggesting that effective desensitization is not dependent on a concurrent interpersonal interaction. An extensive psychophysiological analysis of the desensitization process showed that Ss' fear signals are associated with an increment in autonomic arousal, and that repeated presentation of fear items is accompanied by reduction in autonomic activity. Heart rate levels, responses, and degree of habituation to fear stimuli appeared related to success of desensitization. In a second experiment, the anxiety hierarchies developed for desensitization yielded autonomic gradients, when the items were presented as visualized scenes that varied with fear content and reported clarity of visualization. Overall, the results support the view that desensitization modifies autonomic, as well as gross motor and verbal responses, through learning.

441. Langworthy, O. R. Newer concepts of the central control of emotions: A review. American Journal of Psychiatry, 1955, III, 481-486.

Anatomical and physiological bases for emotional responses are reviewed historically and currently and critically evaluated.

442. Lanier, L. H. An experimental study of "affective conflict." Journal of Psychology, 1941, 11, 199-217.

Fifty words chosen from the Kent-Rosanoff and other lists were spoken to each of 38 women subjects. Records were kept of the response, the reaction time, the galvanic skin response, and the recognition memory for the stimulus words immediately following the experiment and a week later. The response required was the subject's judgment as to whether the affective value of the stimulus word was pleasant, unpleasant, indifferent, or mixed. The author found: (1) mixed responses the fewest; (2) reliable differences between the median reaction times of all 4 categories, with the reaction time for the mixed category the longest; (3) a markedly higher galvanic skin response for the mixed category; and, (4) a superior memory value in the immediate memory test for the mixed words. It is concluded that the term "affective conflict" would seem to be invested with scientific significance and can be assumed to denote, at least tentatively, a distinctive dimension of affective behavior.

443. Larson, J. A. The cardio-pneumo-psychogram and its use in the study of the emotions, with practical application. Journal of Experimental Psychology, 1922, 5, 323-328.

Reports the results of a deception test technique utilizing a continuous blood-pressure curve taken synchronously with a respiratory and a timing curve.

From tests of several hundred individuals the following results were obtained:

1. Quantitative blood-pressure determinations are not infallible.
2. Ordinary galvanometric methods are as unsatisfactory as quantitative blood-pressure determinations alone.
3. In every case of deception, as checked by the cardionuemographic tracings and confessions there are marked changes in the record.
4. In all cases of deception yet encountered the curve differs from that of the controls or the person who does not repress when questioned.

444. Larson, J. A. Lying and its detection. Chicago: University of Chicago Press, 1969.

The general position of the writer is that a deception test has proved to be of practical value when in the hands of suitably trained experts, but even then there will be limitations. He feels that these limitations are sufficient to interfere with any attempt to introduce deception test records into court for use as evidence. On the other hand he has already demonstrated for his associates working in the penitentiary that a deception test probably can be of inestimable value in the preliminary investigation of suspect cases, especially in the selection of the guilty individual and in assisting in securing evidence which may be used in judicial procedure.

445. Larsson, L. Correlations between the psychological significance of stimuli and the magnitudes of the startle blink and evoked EEG potentials in man. Acta Physiologica Scandinavica, 1960, 4b, 276-294.

The effect of variations in the psychological significance of stimuli on evoked potentials in the EEG and on the startle blink has been studied in man. Three different experimental conditions were set up under which the stimuli were assumed to have a high, a moderate and a low significance, respectively. It was found that the magnitudes of the startle blink and the non-specific EEG response were directly correlated to the degree of significance thus defined. The differences between the responses under the three experimental conditions were statistically significant. The short-latency response to peripheral nerve stimulation recorded from the contralateral somatosensory region was more resistant. The cardiac and respiratory rates as well as the EEG from the posterior scalp regions were also recorded under the three experimental conditions. It was found, among other things, that under the condition in which the subjects tensely waited for a stimulus and accordingly must have been highly alert the EEG contained a large amount of alpha waves in contrast to the desynchronization of the record which occurs under other conditions of wide-awakeness.

446. Lasswell, H. D. Verbal references and physiological changes during the psychoanalytic interview: A preliminary communication. Psychoanalytic Review, 1935, 22, 10-24.

In the brief history of psychoanalysis many methods of reporting have been used. The time has come for something more accurate than mere verbal observations on the part of the analyst. Since there are changes in the physiological tension to be observed during the psychoanalytic interview, some method of measuring these in order to make psychoanalysis more objective is necessary. For this purpose physiological means should be used. The author uses a record of pulse rate and galvanic resistance as measured on the galvanograph and the polygraph, and also records the word rate by means of a microphone. He uses subjects who are normal or slightly psychoneurotic. In this preliminary report he indicates that there is evidence that verbal changes and physiological changes during psychoanalytic interviews can be related by means of a technique with precise measurements. In particular, changes in active affects are associated with pulse rate and changes in unconscious tension, associated with electrical skin conductivity.

447. Lawless, J. C., & Wake, F. R. Sex differences in pupillary response to visual stimuli. Paper presented at the meeting of the Society for Psychophysiological Research, Washington D.C., October 1968.

Preliminary investigations into sex differences in pupillary response to visual stimuli were carried out with 14 male and 7 female subjects. Visual stimuli consisting of 20 color slides of varying subject content were presented to subjects in a supine position while pupillary diameter, heart rate, and respiration were continuously recorded using a modified Hess-Polt apparatus. Pupillary records were scored for diameter, latency, reaction times, and response to recovery times.

Pupillary diameters were subjected to four methods of statistical treatment, including a replication of Hess' method. Two of these methods were ultimately rejected as being too gross, but all four methods produced similar results, which were contrary to those obtained by Hess. It was found that on the parameter of pupillary diameter alone, both male and female subjects ranked the visual stimuli in essentially the same fashion, and that the relative M/F score did not produce significantly different results for male or female subjects. In other words males and females showed no interest difference in slides depicting males and females.

448. Lawless, J. C., & Wake, F. R. Sex differences in pupillary response to visual stimuli. Ottawa, Canada: Defense Medical Center, Unpublished and undated.

The results of this replication of Hess' early work are contrary to those that he obtained with male and female Ss and cast doubt by inference on the results of his 1965 study with Seltzer and Shlien using heterosexual and homosexual males. Inspection of the present data shows that, not only is there no difference in response using Hess' relative male-female score, but the male Ss respond in a contrary direction to that stated by Hess. Greater pupillary dilation occurs to male rather than to female stimuli, shown to male Ss, as well as to clothed rather than nude stimuli. Considering the findings regarding reaction time it seems that the use of the relative male-female response score based on diameter alone may be only part of a pattern and exclusive use of it may result in missing salient differentiating features of the pupillary response. The more important parameter of the three seems to be the pupillary reaction time and further investigation in this area should not ignore this variable.

449. Lawson, E. D. Attitude shift as related to palmar sweating in group discussion. (Doctoral dissertation, University of Illinois) Ann Arbor, Mich.: University Microfilms, 1954. No. 10,503.

1. Two experiments designed to bring about a shift in social attitudes as measured by two scales of nationalism, a Flag Scale and a Verbal Scale, were performed. The results demonstrate the effectiveness of the instructed majority technique.

2. The attitudinal shift for one of the groups, nationalists toward internationalism, was greater than for the other, internationalists toward nationalism.

3. Palmar sweat increase scores were found to be related to attitude shift on the Verbal Scale of the internationalist group. This supported the original hypothesis.

4. The nationalist E group was found to show a tendency for attitude shift to be related to palmar sweat decrease. These results did not support the original hypothesis.

5. A relationship between attitude shift and palmar sweat fluctuation was indicated by the results with the nationalist group.

450. Lawson, E. D., & Stagner, R. Group pressure, attitude change, and autonomic involvement. Journal of Social Psychology, 1957, 45, 299-312.

"The hypothesis that attitude change occurring during group discussion is accompanied by anxiety" and "that the amount of attitude change would be proportionate to the anxiety aroused" were tested. Experimental results show that the "instructed majority" technique is an effective way of bringing about a shift in social attitude. The nationalist group shifted more than did the internationalist group, but most people in both groups did change as predicted." However, the second hypothesis was not uniformly supported by the results.

451. Lazarus, R. S. A laboratory approach to the dynamics of psychological stress. American Psychologist, 1964, 19, 400-411.

The current work on the physiology of arousal tends to confuse psychological threat with activation, to confuse the jumping up and down in happy enthusiasm, and the physiological mobilization involved in this, with the state of being threatened by the sight of something, by the thought of something, by a small change in environment which betokens a potential harm. The theoretical and methodological problems inherent in the field of psychological stress will never be solved merely by repeated demonstrations that this or that condition will result in a blood chemistry effect, a change in affect, or an autonomic nervous system reaction—unless at the same time attention is given to the psychological processes involved, and to the empirical conditions which identify these processes. In the experimental laboratory what we need are more carefully thought out analogues of these psychological processes.

452. Lazarus, R. S. Cognitive and personality factors underlying threat and coping. in M. H. Appley & R. Trumbull (Eds.), Psychological stress. New York: Appleton-Century-Crofts, 1967. Pp. 151-181.

In his paper, Dr. Lazarus illustrates one of the most fruitful returns from good experimentation new questions. It is encouraging to find a study that focuses and relates many formerly discrete research problems. This is not a physiological psychologist or a social psychologist studying his own type of problem, but someone who is trying to make sense out of the welter of information derived from an experiment. He asks himself the possible implications of appraisal processes, the role of anxiety, of coping and cognitive processes, and the reasons for inconsistencies between behavioral and physiological indicators. Maybe it required a cross-cultural exposure to bring emphasis upon how the cultural pattern influences responses, responses keyed to the apparent desires of the experimenter and responses which establish base lines about which stressor-induced responses must vary significantly. Certainly, we know that these same methodological problems exist in research here, but we needed this reminder.

453. Lazarus, R. S. Stress theory and psychophysiological research. In L. Levi (Ed.), Emotional stress. New York: Elsevier Publishing Co., Inc., 1967. Pp. 152-177.

A crucial process in psychological stress is appraisal, in which the individual evaluates the significance of the stimulus on the basis of cues that reveal whether or not psychological harm is likely. If we change the appraisal, we change the degree or kind of stress reaction. We cannot understand the pattern of response unless we have a grasp of the intervening processes of coping with threat. The complex pattern of physiological and behavioral response depends on these intervening coping processes. One source of variation in response is the individual himself, in the form of stable dispositions to deal with stress in certain ways. Another is the stimulus, or rather, the kind of coping process it typically generates. When looked at in this way, much of the confusing assortment of facts in psychological stress research becomes comprehensible.

454. Lazarus, R. S., & Alpert, E. Short-circuiting of threat by experimentally altering cognitive appraisal. Journal of Abnormal and Social Psychology, 1964, 69, 195-205.

Previous research had shown that film-induced threat could be reduced by appropriately designed narratives or sound tracks based on ego-defense theory. This study demonstrated that such a narrative, based on the concepts of denial and reaction formation, is even more effective if presented as an introductory statement before the film begins. It significantly reduced both physiological and self-report evidence of stress reaction. Moreover, the amount of stress reaction and the capacity of the narrative to reduce stress reactions depended upon personality. Ss high in disposition to deny threat as measured by various MMPI scales did indeed deny affective disturbance more than low deniers, while showing greater autonomic evidence of stress reaction.

455. Lazarus, R. S., & Avcrill, J. R. Emotion and cognition: With special reference to anxiety. In C. D. Spielberger (Ed.), Anxiety and behavior (2nd ed.) New York: Academic Press, in press.

Our primary concern in this paper has been to spell out a theoretical approach which is centered on the cognitive processes mediating emotional reactions, and to apply it specifically to the emotional syndrome of anxiety. Our key constructs are primary and secondary appraisal, and reappraisal, and we have taken the position that the quality and degree of every emotional response depends upon these cognitions. They highlight a person's (or animal's) transactions with his environment as he searches for and evaluates information about his condition. We treat emotions as complex syndromes, whose definition depends not only on the appraisal but also on the patterning and organization of the various response components. Thus, included in the "nosological" statement which defines an emotion are the diverse response elements of self-reported affect, motor-expressive reactions, instrumental behavior, and physiological change; each of these, however, also has its own special adaptive functions and determinants outside the context of the emotion.

456. Lazarus, R. S., & McCleary, R. W. Autonomic discrimination without awareness: A study of subception. Psychological Review, 1951, 58, 113-122.

1. GSR evidence is presented to indicate that at tachistoscopic exposure speeds too rapid for conscious discrimination (as measured by the subject's inability to report which stimulus was presented), the subject is still capable of making a discrimination. We suggest that the level of perceptual activity indicated by this finding be called subception.

2. It is important to control for unequal preference for stimulus material before drawing conclusions about the accuracy of perceptual recognition.

3. Pairing some of the stimuli with electric shock does not result in a change in the frequency with which they are accurately identified at various exposure speeds.

457. Lazarus, R. S., & Opton, E. M., Jr. The study of psychological stress: A summary of theoretical formulations and experimental findings. In C. D. Spielberger (Ed.), Anxiety and behavior. New York: Academic Press Inc., 1966. Pp. 225-260.

This review discusses a number of empirical studies that focus on the relation between autonomic variables and viewing stressful movies. These studies also deal with the effect of subject set and personality traits on autonomic responses.

458. Lazarus, R. S., Opton, E. M., Jr., Nomikos, M. S., & Rankin, N. O. The principle of short-circuiting of threat: Further evidence. Journal of Personality, 1965, 33, 622-635.

The group of Ss who had heard the "control" orientation had the highest skin conductance and fastest heart rate averages; the "denial" group was intermediate; and the group that heard the "intellectualization" orientation showed the least stress response. Analysis of results for different portions of the film showed that some differences between groups were statistically significant, others not. But the direction of differences was wholly consistent throughout the film: the "control" group always showed the most response, and the "intellectualization" group always showed the least.

These results confirm and extend the findings of previous studies in this series: orienting information which influences beliefs about or attitudes toward the film can reduce the stress induced by the film. The cognitive appraisal of the significance of what is apprehended is crucial in determining the emotional reaction to a stimulus.

459. Lazarus, R. S., Speisman, J. C., & Mordkoff, A. M. The relationship between autonomic indicators of psychological stress: Heart rate and skin conductance. Psychosomatic Medicine, 1963, 25, 19-30.

Repeated research has failed for a long time to establish significant correlations between autonomic nervous system indices of arousal or stress. This has resulted from the use of inappropriate methods of obtaining the correlations—specifically, from interindividual (across subjects) procedures.

When intraindividual approaches were employed, substantial relationships were found between heart rate and skin conductance. The data came from an extensive study of the autonomic effects of a benign and a stressor motion picture film. One intraindividual approach led to a correlation of 0.5 under the stressor condition. The average curvilinear correlation under stress was 0.4.

Thus, there is evidence of a generalized autonomic reaction when the appropriate methods of correlation are used. Moreover, the magnitude of the intraindividual relationship between heart rate and skin conductance was significantly higher under the stressor film than under the control.

460. Lazarus, R. S., Speisman, J. C., Mordkoff, A. M., & Davison, L. A. A laboratory study of psychological stress produced by a motion picture film. Psychological Monographs, 1962, 76, (34, Whole No. 553).

One of the main objectives of the study involved coming to terms with the question of agreement or disagreement between the multiple response dimensions of the interview, Adjective Check List, and autonomic reactivity from which a stress state is inferred. When the various dimensions of response were correlated across subjects, the correlations among different response categories was extremely small. Yet, all of the indicators react significantly to the stressor film condition in the expected direction. This lack of relationship is typical in the literature and has encouraged recent psychophysiological concepts of stimulus and response specificity.

461. Lazarus, R. S., Tomita, M., Opton, E., Jr., & Kodama, M. A cross-cultural study of stress-reaction patterns in Japan. Journal of Personality and Social Psychology, 1966, 4, 622-633.

Responses of Japanese students and comparably educated middle-aged adults to a benign and a stressful motion-picture film were compared with data from American experiments. Self-report measures (Nowlis Adjective Check List of Mood and distress ratings) were obtained before, during, and after the films, and skin conductance was monitored throughout. Ss were divided among "silent," "intellectualization," "denial," and "trauma" orientation treatment groups. In most respects the Japanese response to stress was like the response of Americans: The pattern of mood and the degree and timing of reported distress were similar, and the defensive orientations reduced stress reaction for both subjective and physiological measures. However, the hypothesized interaction between MMPI-scaled personality disposition and defensive orientations was not observed. Unlike Americans, Japanese Ss' skin conductance was almost as high during the benign film as during the stressful film, and their conductance during the stressful film was poorly correlated to the specific stressful scenes. In this respect the Japanese resemble "high anxious" individuals in American studies. Possible explanations in terms of an interaction between Japanese culture and the situation of being experimented on are discussed.

462. Learmonth, G. J., Ackerly, W., & Kaplan, M. Relationships between palmar skin potential during stress and personality variables. Psychosomatic Medicine, 1959, 21, 150-157.

The skin responses of 20 student nurses "during periods of basal rest, sentence completion stress, interview stress, and physical stress were analyzed." The amount of fluctuation of palmar skin potential was found to be closely related to the apparent degree of stress. Measurements of palmar potential fluctuation were then correlated with rankings of all Ss on 22 personality variables (MMPI, Rorschach). The data suggested that the increase in fluctuation was negatively correlated with a group of personality variables which have in common the element of expressivity. The variable was found to correlate positively with personality variables having in common the factor of "restraint and curtailment of unpleasant or prohibited feelings and actions." Fluctuation of palmar potential thus seems to increase in response to stress in proportion to the extent to which a given personality acts to prevent or curtail the expression of feeling. The converse is also true.

463. Lee, C. D. The instrumental detection of deception. Springfield, Ill.: Charles C. Thomas, 1953.

This book deals with lie detection and has the following chapters (1) Historical background, (2) Police Methods, (3) Psychology and Physiology of deception, (4) Instrumental aims, (5) Technique of the deception test, (6) Interpretation of the test results, (7) Disclosure by subject, (8) Increasing police efficiency and reducing the cost of police operations, (9) Collateral applications, (10) Indicated avenues of research, (11) Experimental laboratory tests and (12) Illustrative graphs.

464. Leiderman, P. H., & Morningstar, M. E. Social isolation and social interaction: A behavioral and physiological comparison. Harvard University, Boston, Mass., January 1963.

Eighty-four women performed a simple task under conditions of social isolation and social interaction in a 3-person group. Success and failure in the task were made equivalent in both conditions, and the order of the experience was balanced. Mean level and variability of behavioral initiation, galvanic skin potential, and heart rate were compared. The experiment demonstrates that the social setting can modify physiological response and performance of individuals, some measures are sensitive to the social conditions and the order in which they occur, while others appear to reflect relatively stable characteristics of the individual. The findings in this study have implications for future research on the socialization of behavioral and physiological processes.

465. Leiderman, P. H., & Shapiro, D. A physiological and behavioral approach to the study of group interaction. Psychosomatic Medicine, 1963, 25, 146-157.

A behavioral and physiological technique has been developed for study of complex group interactions in a simplified laboratory setting. An experimental 3-person "guessing game" was devised in order to bring group behavior under manipulation by reinforcement techniques. Nine men and 15 women participated in one individual and five group situations. The number of initiations made by each subject and the basal level galvanic skin potential, sampled at 1-minute intervals, were recorded simultaneously throughout each 40-min. experimental period. A method was devised to relate physiological and behavioral responses over comparable time periods.

466. Leiderman, P. H., & Shapiro, D. Studies on the galvanic skin potential level: Some behavioral correlates. Journal of Psychosomatic Research, 1964, 7, 277-281.

The galvanic skin potential (GSP) level was recorded continuously in several groups of male Ss under a variety of stimulus conditions. GSP was relatively low during conditions of sleep, intermediate during a monotonous learning task, and relatively high during presentation of unpleasant stimuli and wakefulness in a sensory deprivation situation. The findings suggest that GSP can provide a simple objective technique for recording varying stages of behavioral activation.

467. Levi, L. The urinary output of adrenalin and noradrenalin during pleasant and unpleasant emotional states: A preliminary report. Psychosomatic Medicine, 1965, 27, 80-85.

In a strictly standardized experimental setting, 20 healthy female office clerks were shown 4 entirely different types of motion pictures on 4 consecutive days. Bland non-scenery films lowered the urinary catecholamines significantly. An aggression-provoking film and an amusing one were accompanied by similar and significant increases in adrenalin excretion and similar adrenalin/noradrenalin ratios. Obviously, emotional responses rated by the subjects as pleasant may also evoke increased sympathetico-adrenomedullary activity. An anxiety-provoking film raised the excretion levels not only of adrenalin, but also of noradrenalin, significantly above the levels obtained in all 3 previous films. A positive correlation exists between the intensity of emotional arousal, whatever its quality, and the urinary excretion of adrenalin and possibly of noradrenalin.

468. Levy, P., & Lang, P. J. Activation, control, and the spiral aftermovement. Journal of Personality and Social Psychology, 1966, 3, 105-112.

Sixty college students were selected on the basis of anxiety and impulsivity questionnaires. They were then tested for duration of the spiral aftermovement and resting cardiac rate. Longer aftermovements were found for high-anxious Ss than for low-anxious Ss; impulsive students showed shorter aftermovements than nonimpulsives. Aftermovement duration was significantly related to an interaction between heart rate and heart-rate variability. It was concluded that individual differences in the aftermovement are explained in part by different levels of activation and control, as these constructs are assessed through personality questionnaires and by cardiovascular activity.

469. Lewinsohn, P. M. Some individual differences in physiological reactivity to stress. Journal of Comparative and Physiological Psychology, 1956, 49, 271-277.

The present experiment was concerned with the physiological reactivity to stress of patients with duodenal ulcer, essential hypertension, and neuromuscular tension. Two conditions of stress, a modified Cold Pressor Test and a Failure Stress, were used. Heart rate, skin conductance, salivary secretion, and finger tremors were measured.

The following results were obtained:

1. The modified Cold Pressor Test elicited a significant increase in skin conductance, finger tremors, and salivary output.
2. The Failure Stress elicited a significant increase in skin conductance, finger tremors, and heart rate.
3. A significant positive correlation was found between the finger-tremor response to the Failure Stress and the Taylor Scale of Manifest Anxiety and the MMPI subscales for Hypochondriasis and Depression.
4. The Control group manifested a greater increase in heart rate during stress than the other groups.
5. A significant negative correlation of all the "neurotic" subscales of the MMPI with increase in heart rate on the modified Cold Pressor Test was found.

470. Libby, W. L., Jr. The relative effects of physical-perceptual and of psychological properties of pictorial stimuli upon the pupillary response. Paper presented at the meeting of the Midwestern Psychological Association, Detroit, May 1971.

Physical-perceptual, in addition to psychological qualities of pictorial stimuli of known effect upon pupil size were identified. Attention-interest, a psychological quality, was related positively to pupil size, confirming previous findings; however, none of the physical-perceptual qualities of the stimuli such as light-dark contrast affected the pupillary response.

471. Libby, W. L., Jr., & Selinger, S. The relative effects of attention-interest and pleasantness-evaluation upon the GSR. Paper presented at the meeting of the Midwestern Psychological Association, Detroit, May 1971.

Skin conductance responses to pictorial stimuli of known Attention-Interest and Pleasantness-Evaluation characteristics and known effects upon heart rate and pupillary response were observed. The GSR responded like the pupil—both in contrast to the heart—showing a positive relation to Attention-Interest, but none to Pleasantness-Evaluation.

472. Liebllich, I. Manipulation of contrast between differential GSR responses through the use of ordered tasks of information detection. Psychophysiology, 1969, 6, 70-77.

Three variables involved in the production of Short Term Physiological Activation (STPA) were identified: a) frequency of usage of the stimulus by the organism, b) relevance of the stimulus to the organism, and c) whether or not a verbal response to the stimulus is required.

Stimulus sequences for information detection were constructed by combining these variables, and physiological responsiveness was observed in the GSR. It was hypothesized that short term physiological responsivity could be manipulated in an ordered fashion using combinations of the above-mentioned variables. Each one of 54 Ss was tested in six experimental sequences. It was found that it was possible to manipulate the contrast between the GSRs emitted by the S to the critical stimuli, and those produced to the alternative stimuli in information detection tasks in the predicted direction.

473. Liebllich, I., Kugelmass, S., & Ben-Shakhar, G. Efficiency of GSR detection of information as a function of stimulus set size. Psychophysiology, 1970, 6, 601-608.

The reported studies attempted to evaluate the influence of stimulus set size on the efficiency of detection of information through the analysis of GSR responses. Three stimulus set size variations of a standard card detection test were employed. No significant reduction in absolute detection scores was found as the number of cards was increased, and an analysis based on the Theory of Signal Detection also suggested better autonomic discrimination as the stimulus set size increased.

The results suggest that the subject responds to the stimuli by dividing them into a single relevant stimulus and a reject category containing all others.

474. Lifshitz, K. The averaged evoked cortical response to complex visual stimuli. Psychophysiology, 1966, 3, 55-68.

Averaged cortical evoked responses in man to repetitive informationally complex pictorial stimuli, as opposed to other visual stimulation, were obtained from scalp electroencephalographic (EEG) recordings. The method used involved the projection of lantern slides. Included were three different categories (indifferent scenic, repulsive medical, and nude female photographs) assumed to evoke, respectively, neutral, negative, and positive reactions in the normal young male subjects. In all subjects, recordings from occipital or occipitoparietal scalp leads consistently resulted in evoked response patterns to pictorial slides measurably differing from responses to these same slides made non-associational through defocusing, or to blank light flashes. Responses to pictorial stimuli were also different than those to motivated observations of projected words, colors, or geometric patterns. The evoked responses to the three different categories of pictorial stimuli also showed significant differences. These differences were not as marked and were clearly replicable only for some subjects.

475. Lindsley, D. B. Emotions and the electroencephalogram. In M. L. Reymert (Ed.), Feelings and emotion. New York: McGraw-Hill, 1950. Pp. 238-246.

This chapter examines some of the changes which occur in the electroencephalogram in normal and pathological individuals under conditions of emotional stimulation and stress, with the view of finding possible common properties which may shed light upon the mechanism of central involvement in emotion. Minor sections of the article describe EEG characteristics of affective states.

476. Lipe, D. H. Physiological and attitudinal responses to variation in arousal stimulation in negotiation. (Doctoral dissertation, Ohio State University) Ann Arbor, Mich.: University Microfilms, 1966. No. 67-2478.

Assuming that events immediately prior to negotiation might interact with the negotiation task to produce differential results, arousal theory was enlisted and tested for its utility in predicting negotiation outcome when both prior conditions and events in the task itself were systematically varied.

In this research two conditions prior to the negotiation task differed along an intensity dimension: one condition was made to be very high in stimulus potential and was expected to be highly arousing; the other condition was made to be very limited in stimulus potential and was expected to reduce arousal level. The two conditions of the negotiation task varied along a conceptual or cognitive dimension, one assumed to confirm and the other to disconfirm expectancies for a stipulated negotiation procedure. In the latter case basic rules, assumed to exhibit a close correspondence to Garfinkel's paradigm of expectancy for stable concerted actions, were broken. The act of breaking those rules was expected to disconfirm constitutive expectancies, removing grounds for routine human interaction and leaving confusion in its wake. Given the prior arousal and later negotiation conditions, it was predicted that three indices of arousal -- pulse rate, body temperature, and rate of apparent figure reversals of a necker cube -- would yield significantly higher scores subsequent to the disconfirmation than following the confirmation session. It was also predicted that Ss' attitude toward the negotiation task would be least positive when disconfirmation in negotiation followed the earlier high arousal condition and most positive in the confirmation conditions, with intermediate response to disconfirmation following prior low arousal. The high arousal condition did induce higher scores on all three indices of physiological response than did the low arousal condition. Predicted differences between disconfirmation and confirmation groups following negotiation, however,

were not supported by these measures. Hedonic reaction was inferred from the S's responses to six attitude scales. Only one such response was in the predicted direction, viz., the high arousal-disconfirmation group reported significantly less involvement in the negotiation task than did the other three experimental groups. On the whole, the anticipated relationship between attitudinal responses and the two sets of experimental conditions was not obtained.

477. Lockhart, R. A., & Grings, W. W. Comments on "An analysis of GSR conditioning." Psychological Review, 1963, 70, 562-564.

Critical comments are directed toward Stewart, Stern, Winokur, and Fredman's (1961) analysis of GSR conditioning. Their proposed criterion for differentiating between a sensitized and conditioned GSR was found to be inadequate because of the high correlation between measures of these phenomena (.90). A necessary control condition was not provided, making possible the assertion that the so-called "true CR" was actually a sensitized spontaneous response. It is concluded that the criterion may be useful in defining a conditioned response in long delay intervals, but the exclusiveness and universality of application of the criterion to the area of GSR conditioning is more limited than implied by Stewart et al.

478. Lodge, M., & Wahlke, J. Verbal and psychophysiological measures of political attitudes. Paper presented at the World Congress of the International Political Science Association, Munich, August 1970.

This report is limited to exploring correlational associations between verbal and physiological measures of political attitudes. The findings, all of which are tentative, some tenuous, indicate the following: 1) Pearson product-moment correlation coefficients for verbal responses with heart rate and pulse pressure are low; Pearson correlations between the two physiological measures are stronger, statistically significant for 27 of the 40 stimuli. 2) Rank-order correlations show that the verbal and physiological responses are structurally related--negative verbal responses correlated with high heart rate (HR) and carotid pulse pressure (CP) reactivity, positive verbal responses correlated with lower HR and CP reactivity. 3) Rank-order correlations suggest that "incongruities" between verbal and physiological responses reflect attitudinal ambivalence toward the stimuli--greater ANS reactivity toward evocative stimuli, lower ANS reactivity toward conventional political beliefs, feelings, and behavior. Finally, 4) verbal-physiological congruence scores were higher for the League of Women Voters than for the women who were receiving Aid to Dependent Children, perhaps reflecting greater verbal facility and introspective abilities on the part of the League Women.

479. Loftus, T. A., Gold, H., & Diethelm, O. Cardiac changes in the presence of intense emotion. American Journal of Psychiatry, 1945, 101, 697-698.

Forty-one cases of personality disorders with intense emotional reactions were studied. Of this group, 2 were found who showed abnormal electrocardiographic changes accompanying their intense emotional states. Both cases showed no evidence of cardiovascular disease. The investigators state that, although they could not determine from their observation the conditions under which emotions might evoke electrocardiographic changes, the evidence points to the probability of such an influence.

480. Loiselle, R. H. A newer approach to perceptual defense. Perceptual and Motor Skills, 1966, 23, 644.

Ss were 20 female volunteer college students. After Ss reached the criterion on the paired-associate learning sequence, (numbers were associated with neutral & critical pictures) the numbers were presented tachistoscopically below threshold at a constant rate of exposure. Number of exposures to recognition and GSRs were recorded. Using the Mann-Whitney U test, significant differences obtained for the number of exposures to recognition of critical and neutral stimuli (numbers) ($U=127$, $p < .05$) and the GSRs to these stimuli ($U=67$, $p < .05$).

481. Loiselle, R. H., & Mollenauer, S. Galvanic skin response to sexual stimuli in a female population. Journal of General Psychology, 1965, 73, 273-278.

Twenty female college senior volunteers were given the Mf scale of the Minnesota Multiphasic Personality Inventory and had their GSRs recorded while they viewed 18 projected color pictures (nine males and nine females, in three poses and three conditions of dress: clothed, seminude, and nude). There were significant differences between the three conditions as well as differences between Ss ranking above the median and those ranking below the median on the Mf scale. Ss on the masculine end of the scale tend typically to have greater GSRs.

482. Loiselle, R. H., & Williamson, L. T. Perceptual defense to racially significant stimuli. Perceptual and Motor Skills, 1966, 23, 730.

Twenty female Caucasian women were presented with critical and neutral stimuli consisting of 2 digit numbers which had been paired with pictures. The pictures consisted of Negro and white men and women in various mixed combinations. Significant differences were obtained for the number of exposures to recognition and the GSRs between the critical and neutral stimuli. A pro-Negro group, defined by the Sherif-Hovland card sort, demonstrated these findings, while an anti-Negro group did not.

483. Lore, R. K. Palmar sweating and transitory anxiety in children. Child Development, 1966, 37, 115-124.

Recent technical refinements and the procedural simplicity involved in measuring palmar sweat suggest that this method might be a practical means of measuring changes in autonomic nervous-system activity in children which presumably is related to the construct of anxiety. The physiological origins and some of the literature on the status of "emotional sweat" as a valid indicator of autonomic nervous-system functioning were reviewed. The test-retest reliability of the technique over intervals of 1 and 15 days was found to be adequate for most psychological and psychophysiological research. Significant increases in sweating were observed in 4- and 5-year old children after they had heard a short story that was judged to be mildly anxiety-arousing. Since measurements can be made without disrupting the child's ongoing activity, it was concluded that emotional sweat is a potentially useful index of "anxiety" arousal in children.

484. Luborsky, L., Blinder, B., & Mackworth, N. Eye fixation and the contents of recall and images as a function of heart rate. Perceptual and Motor Skills, 1964, 18, 421-436.

Our aim was to illustrate an eye-fixation photographic method of studying cognition both with and without awareness. We focused upon (a) the time of inspection of a part of the visual field in relation to (b) the recall of that part of the stimulus and (c) the relationships of (a) and (b) as a function of heart rate. Recall was defined in two ways: direct and unintentional, i.e., recovery in the content of waking images of picture content which had not appeared in direct recall. Eighteen Ss were overloaded with information by a 6-sec. exposure of a card containing four complex pictures. Waking images were followed by recall. Recovery via images was significantly related to inspection time of the picture quadrant; direct recall was not. The more the person was accelerated in his response via heart rate or fixation rate, the greater his recovery in images.

485. Luborsky, L., Blinder, B., & Mackworth, N. Eye fixation, and recall of pictures as a function of GSR responsivity. Perceptual and Motor Skills, 1963, 16, 469-483.

Our aim was to construct an experimental situation with which we could explore relationships between the looking behavior of the eye and recall of pictures differing in threatening content. Seventeen Ss individually were shown 10 pictures for 10 sec. each with concurrent eye fixation photography (Mackworth eye camera) and GSR recording. The main analysis consisted of breaking high and low GSR "Peak" (i.e., the high point of GSR deflection during the ten seconds of looking) against "mean duration of each fixation," inspection time of "ground" of each picture (rather than "figure"), recall duration, instances of forgetting the picture, and postponement in recall order. Significant differences were found in most of these measures in a direction which seemed consistent with a concept of avoidance-under conditions of high GSR responsivity more than under low GSR responsivity, Ss tended to show avoidance tendencies in both looking and recalling behavior.

486. Lykken, D. T. The GSR in the detection of guilt. Journal of Applied Psychology, 1959, 43, 385-388.

How accurate is a lie detector in determining guilt? "Forty-nine male college students, after random assortment into four groups, were required to enact one, both, or neither of two mock crimes. All were then given a guilty knowledge test, employing the GSR, which used six standard questions relating to each of the two crimes. A simple, objective, and a priori scoring system was used to determine guilt. Forty-four or 89.8% of the Ss were assigned to their correct group, against a chance expectancy of 25%. Considering the crimes separately, all Ss innocent of a crime were correctly classified while 44 of 50 interrogations of guilty Ss gave guilty classifications, a total of 93.9% correct classification against a chance expectancy of 50%.....Detection of guilty knowledge....is demonstrably capable of very high validity in those situations where it can be used."

487. Lykken, D. T. The validity of the guilty knowledge technique: The effects of faking. Journal of Applied Psychology, 1960, 44, 258-262.

A method of guilt detection using the GSR is described, which involves presenting the S with a set of questions concerning matters which could be known only by a guilty individual. Each question is followed by four or five alternatives, of which one is "correct." Scoring the response record for "guilt" involves identifying any pattern of nonrandom reactivity to the set of "guilty" alternatives. Each S is used as his own control and the scoring is entirely objective.

An experiment is reported in which 20 sophisticated Ss were given training in the theory of the GSR and of the guilty knowledge method, were allowed to practice inhibiting or producing false GSRs, and instructed concerning the interrogation procedure and scoring system to be used. These Ss were then offered \$10.00 if they could "beat" the test. Correct classification was obtained in 100% of these cases without ambiguity, using objective scoring of the GSR protocol alone.

488. Lykken, D. T. Valins' "Emotionality and autonomic reactivity:" An appraisal. Journal of Experimental Research in Personality, 1967, 2, 49-55.

Research on Schachter's theory of emotionality is reviewed with special attention to some work reported in this Journal by S. Valins. The argument that emotionality is strongly affected by S's cognitive interpretation of his visceral reactions seems well-taken. The hypothesis that autonomic hyper-activity can, through habituation, lead like hypo-reactivity to emotional flatness has not found experimental support. Valins' method of measuring "emotionality" is criticized as is the tendency of the Schachter group to rely on heart rate as their sole indicant of autonomic arousal. A different interpretation of Valins' findings is offered, based on speculation by J. Lacey, which suggests that the cardioacceleration shown by "high emotional" Ss in anticipation of noxious unavoidable stimuli may be part of an adaptive defensive reflex of reticular inhibition and afferent "de-tuning."

489. Lynch, J. J., & Paskewitz, D. A. On the mechanisms of the feedback control of human brain wave activity. Journal of Nervous and Mental Disease, 1971, in press.

The source of these feedback mood statements and the process through which they come about are both somewhat obscure. Although the study of the relationship between brain wave activity and mental processes began quite early in the EEG literature, and subjective reports of mental blankness and abstract thinking were associated with alpha activity, to say, as does Masiow that we can now "teach people how to feel happy and serene" appears premature. Certainly no simple and direct relationship exists between alpha density and subjective feelings. Individuals with high chronic alpha density have not been shown to be markedly different from others with lower levels. Simple physical maneuvers like closing or opening the eyes have not been related to mood change of the sort reported in feedback situations and yet such eye maneuvers markedly affect alpha density. It would appear fruitful to examine some aspects of the feedback situation itself in some detail.

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490. Malmö, R. B. Anxiety and behavioral arousal. Psychological Review, 1957, 64, 276-287.

The main purpose of this paper is to consider some recent experimental data which suggest a way out of the present confusion surrounding the concepts of motivation, emotion, and anxiety. Two lines of investigation, each employing physiological methods, are examined. In one experimental program, measures such as steepness of muscle-potential gradients and level of palmar skin conductance were found to be useful indicants of arousal level. The results of several experiments demonstrated significant relationships between such physiological indicants and excellence of performance on various motor tasks, such as mirror tracing and tracking. In this empirical setting, problems of relationship between concepts of motivation and emotion are reconsidered.

491. Malmö, R. B. Finger-sweat prints in the differentiation of low and high incentive. Psychophysiology, 1965, 1, 231-240.

The differential effect of incentive on finger sweating compared with the effects on various other physiological measures was investigated in a group of 59 Ss. Finger sweating (FS) appeared slightly superior to palmar conductance (PC) in discriminating between low and high incentive conditions, but heart rate (HR) and muscle potentials appeared to be the best of those discriminators used.

Correlations between PC and visual ratings for FS were 0.65 and 0.69 for high and low incentive conditions, respectively. There were numerous significant correlations between physiological measures (at relatively low levels), but the two FS measures correlated only with PC and with each other. Correlations between physiological and performance measures were also obtained. On the one hand HR and electromyograms (EMGs), and on the other PC and FS ratings, differed with respect to the incentive conditions under which significant correlations with performance were obtained. In the main, HR and EMGs showed significant correlations with performance under low, and PC and FS ratings under high incentive.

492. Malmö, R. B. Physiological gradients and behavior. Psychological Bulletin, 1965, 64, 225-234.

Physiological gradients accompanying mental activity have been found in skeletal-motor and autonomic recordings, commencing with the onset of the behavior sequence and terminating at its conclusion. Experimental evidence is presented indicating that these gradients do not signify increasing activation (or arousal) during the behavioral sequence (e.g., task or period of attentive listening). On the contrary, the EEG evidence clearly indicates that cortical activity remains relatively constant during the sequence when skeletal motor and cardio-respiratory levels show progressive rise. While the gradients therefore appear not to represent increasing motivation, or the like, during the task, there is strong evidence indicating that the steepness of the gradients is a function of motivational level.

493. Malmö, R. B., Boag, T. J., & Smith, A. A. Physiological study of personal interaction. Psychosomatic Medicine, 1957, 19, 105-119.

The main purpose of the present investigation was to study the interaction between interviewer and the one interviewed by means of physiological recording techniques.

Physiological recordings were taken from all participants: examiner, interviewer, and patients. Muscle potentials were recorded from neck and from speech muscles, and the heart rate was recorded continuously by means of EKG. All speech was recorded synchronously with the physiological tracings.

The results revealed differential physiological reactions to supportive vs. threatening situations, not only in the patients but also in the examiner. In brief rest intervals following praise, the speech-muscle tension fell rapidly, in contrast to the nonfalling tension following criticism. This phenomenon of differential reaction was noted in the examiner as well as in the patients. That is, after he had been critical his tension remained high in contrast to the falling tension after he had praised. Related findings were obtained from the second part of the experiment (during the interview).

494. Malmö, R. B., & Davis, J. G. Autonomic and somatic gradients as indicants of motivation in motor performance. American Psychologist, 1956, 11, 389. (Abstract)

Previous studies from our laboratory have shown that steepness of electromyographic (EMG) gradients during motor tasks are increased by raising incentive; and we have other evidence that EMG gradients may serve as a measure of drive or "arousal." The purpose of the present study was to determine whether similar gradients appear in autonomic functions during mirror drawing.

495. Malmö, R. B., Shagass, C., & Davis, F. H. Specificity of bodily reactions under stress. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 231-261.

1. Physiological recordings were taken from 74 mental patients in an experimental stress situation consisting of a standard series of painful stimulations, presented by a Hardy-Wolff thermal-stimulator. Patients were classified with respect to the presence or absence in the clinical history of (1) cardiovascular complaints, and 2) head and neck pains. The physiological battery included recordings of: heart rate, respiration, and neck muscle potentials which are known to be related to the symptoms considered. The physiological reactions of the patients, with and without each type of symptom, were then compared.

2. Three individual case studies undertaken in an interview situation (interviews dealt with significant events in patients' personal history) revealed certain details concerning symptom mechanisms operating at "clinical" and "subclinical" levels in the particular patients under investigation. These observations were in line with predictions based on results from the group study.

496. Malmö, R. B., Shagass, C., & Davis, F. H. Symptom specificity and bodily reactions during psychiatric interview. Psychosomatic Medicine, 1950, 12, 362-376.

1. Three individual case studies were undertaken in the interview situation in order to provide data supplementary to the data from group (cross-sectional) studies, bearing on the principle of symptom specificity.

2. Observations from present individual case studies are in line with predictions based on results from the group studies. "Subclinical" disturbances in critical symptom areas were noted in response to stress of interview, and in response to discussions of life situations distressing to the patient. These disturbances appeared to be specific in the sense of reflecting lowered threshold for disturbance in bodily areas associated with the symptom in question. Continuous study, particularly of one case, afforded the kind of repeated day-to-day study which established the consistency of the phenomenon.

3. Such findings constitute evidence for specificity of association between symptoms and physiologic mechanisms, and thus support the principle of "symptom specificity" which states that the particular physiologic mechanism of a somatic complaint is specifically susceptible to activation by stressful experience.

497. Malmö, R. B., Smith, A. A., & Boag, T. J. Personal interaction and tension. American Psychologist, 1955, 10, 347. (Abstract)

Results revealed differential physiological reactions to supportive versus threatening attitudes not only in patients but also in examiner. In brief test intervals following praise, speech-muscle tension fell rapidly, in contrast to static tension following criticism. This phenomenon of differential reaction was noted in examiner as well as in patients. That is, when he was critical his tension remained high in contrast to falling tension after he praised. Related findings were obtained from the second part of the experiment (during interview).

498. Malmö, R. B., Smith, A. A., & Köhlmeyer, W. A. Motor manifestation of conflict in interview: A case study. Journal of Abnormal and Social Psychology, 1956, 52, 268-271.

This is the fourth successive case in which specific forearm tension has been related to the topic of "hostility." Without exception, all cases showed greater forearm tension associated with hostility. Three of the four cases showed the correlation of sex content with specific leg tension, and--interestingly enough--all were women. Whether specific leg tension associated with sex content is found only in women is a question for further investigation.

In the present case, it was the left forearm and left leg which showed the difference. The unilaterality in this case agrees with previous findings. Why this right-handed case should show the phenomenon in the left limbs, though, is not clear.

499. Malmstrom, E. J., Opton, E., Jr., & Lazarus, R. S. Heart rate measurement and the correlation of indices of arousal. Psychosomatic Medicine, 1965, 27, 546-555

Twenty-two subjects watched a stressor motion picture film, "Subincision," which was expected to stimulate autonomic arousal, and 22 control subjects saw a benign film, "The Corn Farmer." Heart rate and skin conductance were recorded. When analyzed by previously used methods, skin conductance changes over time showed a close correspondence to film content, while heart rate did not. A new method of sampling heart rate records, the method of mean cyclic maxima, gave results closely paralleling those of skin conductance. This method appears to be a major improvement over previous approaches to heart-rate measurement in that it produces greater correspondence to both skin conductance and to the known characteristics of the motion picture stimulus. Since an earlier study showed that phenomenological ratings of emotional reaction closely followed a similar curve of skin conductance, it is expected that future studies will show heart rate variation and phenomenological ratings also to be closely related.

500. Maltzman, I., & Langdon, B. Semantic generalization of the GSR as a function of semantic distance or the orienting reflex. Journal of Experimental Psychology, 1969, 80, 289-294.

The experiment was designed to investigate semantic generalization of the GSR as a function of connotative similarity as determined from semantic differential ratings and as a function of the order of presentation of the generalization test words. Half of the Ss were conditioned with a positively evaluated CS word and half with a negatively evaluated word. The CS conditions were subdivided into three groups for generalization: Group DS received the generalization test words in a decreasing order of connotative similarity from the CS word; Group IS received the test words in the order of increasing similarity; and Group R received their test words in different random orders. It was found that positive and negative CS words conditioned equally well. No reliable evidence was obtained of semantic generalization as a function of the order of presentation of the test words, indicating the influence of the orienting reflex evoked by the change from conditioning to generalization test words. These results contradict Osgood's theory of reciprocally antagonistic representational mediation processes and his theory that semantic generalization may occur as a function of similarity in connotative meaning.

501. Maltzman, I., & Mandell, M. P. The orienting reflex as a predictor of learning and performance. Journal of Experimental Research in Personality, 1968, 3, 99-106.

The complex nature of the concept of the orienting reflex (OR) was noted, and recent unpublished results of experiments were summarized which demonstrated that individual differences in physiological measures of the orienting reflex predicted between response systems. For example, individual differences in the GSR measure of the OR predicted individual differences in semantic conditioning of alpha blocking, and differentiated between "aware" and "unaware" Ss in the experiment. It was found that a GSR measure of the OR induced by verbal reinforcement differentiated "aware" from "unaware" Ss in an operant verbal conditioning task. Some of the theoretical implications of these and related studies were briefly discussed as well as the problems inherent in research on the orienting reflex in human Ss.

- 502 Maltzman, I., & Wolff, C. Preference for immediate versus delayed noxious stimulation and the concomitant GSR. Journal of Experimental Psychology, 1970, 83, 76-79.

A structured forced-choice situation was used to investigate human preferences for short versus long delayed noxious stimulation. Magnitude of the GSR evoked by the noxious stimulation, white noise, was determined, as well as semantic differential ratings of the noises under the short and long delayed conditions. There was a highly reliable preference for the short rather than the long delayed noise, smaller GSRs in the short delay, and less unpleasant ratings. An interpretation of the results in terms of the inhibition of the response to the noise by the orienting reflex evoked by the preceding signal was suggested.

503. Mandler, G., & Mandler, J. M. Associative behavior and somatic response. Canadian Journal of Psychology, 1962, 16, 331-343.

Thirty-two Ss were presented with 20 non-anxiety-producing stimuli consisting of nonsense syllables, adjectives, pictures, and Rorschach cards. The Ss were required to give continuous single word associations to each stimulus for 30 sec. At the same time, GSR and heart rate were continuously monitored. The analysis was concerned with individual and stimulus differences in the frequency of associations, percentage of idiosyncratic responses, reaction time, and the two physiological responses. The major findings were:

- (1) Ss who show a high rate of associative frequency also tend to give a high percentage of idiosyncratic responses and to respond to the stimuli with shorter reaction times.
- (2) Stimuli that evoke many associations tend to evoke a low percentage of idiosyncratic responses and show short reaction times.
- (3) Individual differences in verbal behavior are not related to differences in physiological response.
- (4) Stimuli that show high associative frequency also evoke large conductance changes. However, the GSR response appears to be more a function of relative idiosyncrasy than of frequency; stimuli which produce less idiosyncratic and more common content show larger conductance changes.

504. Mandier, G., Mandler, J. M., Kremen, I., & Sholiton, R. D. The response to threat: Relations among verbal and physiological indices. Psychological Monographs: General and Applied, 1961, 75, (9, Whole No. 513).

Two studies are reported, the 1st involved 32 Ss who were presented with a Phrase Association test while their verbal and physiological reactions are recorded; the 2nd involved 28 Ss who were presented with phrases and their verbal reactions recorded. The 1st group was also required to respond to self-rating scales of anxiety and visceral perception while the 2nd group was given a group Rorschach. Both sets of Ss were administered the Autonomic Perception Questionnaire and the Taylor's manifest anxiety scale. The results attained indicate that reliable differentiation can be made by the verbal response measures between neutral phrases and those with threat content. Physiological measurements also differentiated these stimuli. It was indicated that the method gives promise in distinguishing between generalized anxiety evoked by the test situation and the specific anxiety reactions resulting from particular kinds of stimuli. It was noted that intellectual tasks are more susceptible to disruption by the Ss' perceptions and preoccupation with bodily events while affective tasks are more disturbed by physiological involvement.

505. Mandier, G., Mandler, J. M., & Uviller, E. T. Autonomic feedback: The perception of autonomic activity. Journal of Abnormal and Social Psychology, 1958, 56, 367-373.

Two groups of Ss were selected who showed consistency in their report of autonomic activity (autonomic feedback). High perceivers were Ss who reported a high level of autonomic feedback in anxiety situations in general and also reported a high level in a specific stress situation. Low perceivers were Ss who reported a low degree of autonomic feedback in both situations. The results showed:

1. Positive correlations between scores on an autonomic perception questionnaire and other paper-and-pencil tests of anxiety reactions.
2. High perceivers showed significantly greater autonomic reactivity than low perceivers.
3. High perceivers tended to overestimate their autonomic responses, while low perceivers tended to underestimate them.

506. Manfredini, J. A bio-afetividade. (Bio-affectivity). Journal Brasileiro de Psiquiatria, 1954, 3, 40-60.

A didactic approach to what the author calls bio-affectivity, as against the concept of affectivity. Stress is placed on biological antecedents. Literature in this area is reviewed. Relationship to such psychological phenomena as sensation, personality, tropism, reflex and instinct is made.

507. Marcuse, F. L., & Bitterman, M. E. Minimal cues in the peak-of-tension procedure for determining guilt. American Journal of Psychology, 1946, 59, 144-146.

This article points out that the accuracy of the peak-of-tension procedure in detecting guilt can be affected by the interrogator unwittingly giving cues when asking questions about the critical item.

508. Marks, I., Boulougouris, J., & Marset, P. G. Flooding versus desensitisation in the treatment of phobic patients: A crossover study. Unpublished manuscript. The Maudsley Hospital, London, England. Undated.

Sixteen patients with phobic disorders were allocated at random into one of two treatment-order groups. Eight patients had 6 sessions of desensitisation in fantasy followed by 6 sessions of flooding in fantasy, while another 8 patients had the same two treatments in the reverse order. Every fantasy session lasted 50 minutes, and the 5th and 6th sessions of each treatment were followed immediately by desensitisation or flooding in practice for 70 minutes. Treatment was 2 to 3 times weekly, and average treatment time was 5 weeks. Flooding only involved cues relevant to fears which patients had expressed, and 'dynamic conflicts' were not utilized. Ten novice therapists gave the treatment, each patient receiving both treatments from the same therapist. Clinical and physiological assessments were made before treatments and 2 days after the 6th and 12th sessions. Clinical ratings of phobias were reliable. Both treatments produced significant improvement of phobic ratings, but only flooding produced significant physiological improvement (heart rate and skin conductance during phobic imagery). Flooding was significantly superior to desensitisation on clinical ratings of main phobia and in reducing heart rate and skin conductance activity during phobic imagery.

- 509 Marks, I. M., & Gelder, M. G. Transvestism and fetishism: Clinical and psychological changes during faradic aversion. British Journal of Psychiatry, 1967, 113, 711-729.

This paper reports changes in transvestism and fetishism during faradic aversion treatment, as shown by clinical reports, erections measured on a penis transducer, and attitudes on evaluative scales of the semantic differential. Faradic shocks were given to the arm while patients carried out their deviant behaviour in fantasy and in practice. A variable partial reinforcement schedule was followed.

Attitude changes with aversion fell broadly into three categories: those concerning the sexual deviations became selectively devalued, those about family remained stable, while other concepts fluctuated.

Attitudes and autonomic responses changed in the same direction at different speeds. Attitudes about sexually deviant objects changed most in the first few sessions of aversion before erections were completely extinguished. During partial relapse attitude reversal again preceded return of erections.

510. Marks, I., Marset, P., Boulougouris, J., & Huson, J. Physiological accompaniments of neutral and phobic imagery. Psychological Medicine, 1971, 1, in press.

Each of 10 phobic patients were treated by 6 sessions of flooding and 6 sessions of desensitisation in a balanced crossover design. Clinical and physiological measurements were made before treatment and after the 6th and 12th sessions of treatment. Physiological measures were made of increase in heart rate and in spontaneous fluctuations and maximum change in level of skin conductance during neutral and phobic imagery. Patients estimated subjective anxiety during the imagery. Heart rate, skin conductance and subjective anxiety ratings all differentiated significantly between phobic and neutral imagery. Increase in autonomic activity during imagery was roughly proportional to the intensity of the imagery in a phobic hierarchy. Autonomic changes during imagery imagined in silence did not produce autonomic changes considerably different from those during imagery stimulated by a running commentary from the therapist. Clinical ratings correlated significantly with measures of skin conductance so that autonomic measures can be useful indicators of change after treatment. However, heart rate, skin conductance and subjective anxiety during brief periods of imagery did not usually correlate significantly with one another. This supports the view of emotion as a system of responses linked imperfectly across several systems.

511. Marston, W. M. Systolic blood pressure symptoms of deception. Journal of Experimental Psychology, 1917, 2, 117-163.

1. The behavior of blood pressure (BP) does not act as the least indicator of the objective validity of the story told by any witness, but it constitutes a practically infallible test of the consciousness of an attitude of deception. Mere awareness of a mistake, even if the mistake is uncorrected, or the mere addition of trifling details, even if the subject is conscious of such additions, will not constitute that mental situation which is the necessary stimulus to fear, and will not, therefore, cause the BP to rise.

2. The significant curve of deception differentiates a story the foundation of which is false from a story mostly true, but containing one or two substantial lies. The sudden sharp, short rises of the BP betray these substantial lies in an otherwise true story. It seems probable that, if a truthful witness became violently angry at some chance question of the examiner, or if he suddenly saw his worst enemy glaring at him, gun in hand, in the court-room, his BP would suffer a short abrupt rise, but if such extreme outside influences are avoided, all major BP modifications would seem to depend upon the deception elements of the story itself.

512. Marston, W. M. The lie detector test, New York: R. R. Smith, 1938.

One chapter gives detailed directions for the use of the lie detector test. During cross-examination the blood pressure is recorded either continuously or several times a minute. Certain characteristic rises in the systolic pressure are associated with lies. A qualified expert makes very few errors, and even these are readily eliminated by additional testing of the subject. The rest of the book presents the history, present status, and future of the test. It was developed by the writer at Harvard in 1915, and has slowly gained in acceptance since that time. It has been shown to be superior to other methods (psychogalvanic, word association, etc.). At present it is used widely for the detection and punishment of crime, and to protect employers from dishonest employees. Marston has also used it in solving marital problems and believes it has a promising future as a preliminary to marriage. The test is particularly valuable in dealing with personality problems, for it will detect self-deception, thus rapidly clearing the ground for readjustment. Marston predicts rapid extension of the test. When it is used widely it will furnish a motive for moral education, for people will cultivate honesty if they know that dishonesty will be detected.

513. Martin, B. Galvanic skin conductance as a function of successive interviews. Journal of Clinical Psychology, 1956, 12, 92-94.

Twenty Ss who scored high on the Taylor Anxiety Scale were seen for 5 successive sessions. Ten Ss experienced a free association period followed by a discussion of their associations; and the other ten, the control group, experienced a free association period followed by listening to their own associations played back to them. Measures of galvanic skin conductance were obtained during all sessions. For the free association periods there was a significant tendency for the average skin conductance to decrease as a function of successive sessions for both groups. Average skin conductance during an initial relaxation period did not change as a function of successive sessions, but was less than the skin conductance during free association for all sessions.

514. Martin, B. The assessment of anxiety by physiological behavioral measures. Psychological Bulletin, 1961, 58, 234-255.

There is little research to support the contention that clearly defined patterns of physiological-behavioral responses associated with anxiety arousal can be distinguished from other arousal patterns. Intercorrelations among physiological measures of anxiety obtained under either resting states or under stress are generally low. No studies have been reported in which several measures of behavior were obtained simultaneously with a variety of physiological measures under conditions likely to be fear arousing.

515. Martin, I. Personality and muscle activity. Canadian Journal of Psychology, 1958, 12, 23-30.

1. Muscle tension of the frontalis and right forearm extensor muscles was assessed electromyographically in 75 university students selected on the basis of extreme scores on neuroticism and introversion-extraversion questionnaires to provide four groups: (i) introverted neurotics, (ii) extraverted neurotics, (iii) introverted normals, (iv) extraverted normals.

2. No significant differences in tension levels were observed between groups, either during relaxation or during verbal response to a series of questions.

3. All groups manifested significantly higher tension levels while being questioned. Final resting tension level was significantly lower than initial levels.

4. The relationship of the questionnaire assessment of neuroticism and introversion-extraversion to psychiatric classification was considered and the need for further validation studies was stressed.

516. Martin, I. Discriminatory GSRs. Activitas Nervosa Superior, 1965, 7, 217-223.

A study of effect of discrimination schedule on GSR frequency and amplitude and of the effect of informative vs. noninformative instructions. Early in the schedule appeared significant discrimination to positive and negative stimuli. GSR conditioning may refer not to acquisition process, but to the maintenance of higher level of responding to the positive conditioned stimulus.

517. Martin, R. D., & Edelberg, R. The relationship of skin resistance changes to receptivity. Journal of Psychosomatic Research, 1963, 7, 173-179.

The hypothesis that the GSR may be part of a screening mechanism that regulates reception of stimulus material was examined by monitoring skin resistance in 20 male medical students while they listened to 14 different, taped speech passages. Throughout each passage they indicated with lever pressing their positive, negative, or neutral reaction to the material. "The predicted relationship could be demonstrated only in the direction of increasing subjective negativity (irritation), which was accompanied by a fall of GSR activity." Slope of base resistance was a more sensitive measure of this relation than either sum of GSR amplitude or GSR frequency.

518. Mason, J. W., & Brady, J. V. The sensitivity of psychoendocrine systems to social and physical environment. In P. H. Leiderman & D. Shapiro (Eds.), Psychobiological approaches to social behavior. Stanford: Stanford University Press, 1964. Pp. 4-23.

It appears then that the psychoendocrine approach may afford access to the study not only of emotionality in the sense of quantitating or differentiating affective changes, but also of the very broad range of normal and abnormal psychological functions which serve to prevent, minimize, or counteract affective disturbances. The recent studies of Friedman, Mason, and Hamburg, Sachar *et al.*, and Wolff *et al.* show that impressive evidence is accumulating in support of this notion, and it seems likely that this may eventually prove to be a major area of applicability of the psychoendocrine approach in psychiatry. To the extent that emotional and defensive mechanisms are of interest in studies of social processes, it seems then that this approach may be useful to investigators in the field of social behavior.

519. Mason, M. Changes in the galvanic skin response accompanying reports of changes in meaning during oral repetition. Journal of General Psychology, 1941, 25, 353-401.

Ten subjects were employed in 3 experiments in which the types of change in meaning were studied in relation to galvanometric modifications. In the first experiment (certainty of meaning) the subjects learned sets of nonsense syllables, and they were asked to state whether they were certain of the correctness of their performances at various stages in the learning. In the second experiment (discovery of meaning) series of scrambled meaningful words were presented, and the subject was asked if he saw their meaning. In the third experiment (loss of meaning) the subject repeated a word over and over and signalled when it had lost its meaning. The greatest galvanometric change in experiment 1 "occurred during answers denoting the most uncertainty; the least change accompanied answers denoting the most certainty." In the second experiment more galvanometric change "accompanied answers denoting Discovery-of-Meaning than accompanied those denoting lack of such discovery." The third experiment showed that "more change occurred in intervals in which signals of loss of meaning had been given, than occurred in those without such signals."

520. McAdam, D. W., Knott, J. R., & Rebert, C. S. Cortical slow potential changes in man related to interstimulus interval and to pre-trial prediction of interstimulus interval. Psychophysiology, 1969, 5, 349-358.

Two experiments were performed to explore further the relationship between the cortical slow potential change known as the "contingent negative variation" (CNV) and the concept of "expectancy."

In Experiment I, 24 male Ss were presented click pairs, with inter-click intervals of 800, 1600, and 4800 msec (2 blocks of 10 trials each, counterbalanced between Ss for order), and instructed to press a key after the second click. Interval by order by trials analysis of variance showed interval to be the only significant factor: CNVs were lower and RTs longer as interval increased.

In Experiment II, 8 female Ss given 60 pairs of clicks, 30 each with separations of 1200 and 2400 msec, were instructed to respond as in Experiment I, and were asked to make a pretrial prediction of the interval they would next receive. Analysis of variance of RTs showed that Ss responded slower when the interval was other than that predicted. Prediction by reception by subjects analysis of variance of CNV amplitude at the 1200 msec point gave a significant F only for prediction, mean amplitude for short being higher than for long. A similar design applied to CNV amplitudes at both the 1200 and 2400 msec points when Ss received the

long interval yielded a significant measurement point by interval predicted interaction; at the 1200 msec point, short predictions were followed by higher CNVs than were long predictions; at 2400 msec, the opposite was found.

These data combine with those already in the literature to indicate that the relationship between "expectancy" and the CNV is far from simple, and that cognitive and motivational factors play a significant role in determining CNV amplitude.

521. McBride, G., King, M. G., & James, J. W. Social proximity effects on galvanic skin responses in adult humans. Journal of Psychology, 1965, 61, 153-157.

The GSR of Ss of both sexes to male and female Es was studied with Es adopting differing spatio-proximal and -distal positions with respect to Ss. The GSR to Es at one, three and nine feet (with E and S fixating each other's eyes) showed no differences on the average between one foot and three feet though the response was significantly less at nine feet. The response to male Es was greater than that to female Es at one foot with eyes fixated.

The GSR was greatest when S was approached frontally, while side approach yielded a greater effect than rear approach.

The response to Es of the same sex was less than to Es of the other sex.

522. McComb, D. Cognitive and learning effects in the production of GSR conditioning data. Psychonomic Science, 1969, 16, 96-97.

The notion that GSR conditioning data are purely a function of S's awareness of relevant stimulus contingencies is challenged. An experiment is described in which, using a manifest task to disguise the true nature of the experiment from S, greater differential responding to the CS (in extinction) was seen in the case where Ss experienced conditioning trials having been informed previously of the CS-UCS contingency, than when this information was not followed by conditioning trials. The familiar finding of no conditioning without awareness is also supported.

523. McCurdy, H. G. Consciousness and the galvanometer. Psychological Review, 1950, 57, 322-327.

The author presents a case for a connection between the subjective evaluation of stimuli and the GSR from results of experiments by himself and others.

524. McDonnell, G. J., & Carpenter, J. A. Manifest anxiety and prestimulus conductance levels. Journal of Abnormal and Social Psychology, 1960, 60, 437-438.

This study investigated the functional relationship between conductance levels and an index of manifest anxiety. A curvilinear relationship was found and discussed in relation to the use of the conductance level as an index of emotionality.

525. McGinn, N. F., Harburg, E., & Julius, S. Blood pressure reactivity and recall of treatment by parents. Journal of Personality and Social Psychology, 1965, 1, 147-153

The purpose of this research was to test the general hypothesis that Ss who recall their relations with their parents as having been stressful have higher blood pressure reactivity than do Ss who recall their parents in more positive terms. Two groups of Ss were combined: (a) those who had a casual high (> 139 mm.Hg.) or low (< 110 mm.Hg.) systolic blood pressure reading taken during a mass physical examination: ($N = 83$), and (b) those with normal pressure ($N = 24$). Recall of parents was measured by a semantic differential parent image form and by questionnaire. Blood pressure reactivity was measured by degree of elevation in response to the cold pressor test. Multiple correlations provide support for the hypothesis with respect to recall of relations with mother, but not for recall of relations with father.

526. McGinn, N. F., Harburg, E., Julius, S., & McLeod, J. M. Psychological correlates of blood pressure. Psychological Bulletin, 1964, 61, 209-219

As a physiological measure of emotion, blood pressure has been relatively neglected in recent years. This review considers three questions: Do certain stimuli produce replicable changes in blood pressure? Do cognitive states influence blood pressure reactivity? Is there a causative relationship between personality and high blood pressure? Available research indicates that the first two questions can be answered affirmatively, though there are a number of methodological problems yet to be resolved. No direct evidence is available for the third question and tangential studies offer conflicting results.

527. McGinnies, E. Emotionality and perceptual defense. Psychological Review, 1949, 56, 244-251.

Recognition thresholds and galvanic skin responses during the pre-recognition period were measured for sixteen observers presented tachistoscopically with eleven neutral and seven emotionally-toned words, randomly ordered. The observers reacted with GSR's of significantly greater magnitude during the pre-recognition presentation of the critical words than they did before recognizing the neutral words. In addition, the observers displayed significantly higher thresholds of recognition for the critical than for the neutral words. Hypotheses made before recognition of the charged words were of such a nature as to indicate resistance to recognizing these words. The findings are interpreted as representing conditioned avoidance of verbal symbols having unpleasant meanings to the observer. The stimulus word serves as a cue to deeply imbedded anxiety which is revealed in autonomic reactivity as measured by the GSR. Avoidance of future anxiety is contemporaneously aroused in the form of perceptual defense against recognition of the stimulus object.

528. McGinnies, E. Discussion of Howes' and Solomon's note on "Emotionality and perceptual defense." Psychological Review, 1950, 57, 235-240.

Howes' and Solomon's criticism of a previous article by the author is attacked on the grounds that they have combined two different functions into a single regression line; they have appealed to "common morality" and personal observations; they have ignored the implications for an adaptive theory of perception contained in the author's analysis of pre-recognition hypotheses; and their interpretation of subject behavior is inconsistent with additional experimental data available to the author.

529. McGinnies, E. Cross-cultural investigation of some factors in persuasion and attitude change, an overview of the research. Technical Report No. 2, December, 1963, University of Maryland, contract NONR3720(01), NR171-250, Office of Naval Research.

In this experiment we exposed small groups of Japanese university students to persuasive communications dealing with the Cuban situation, recorded galvanic skin responses while they listened to the arguments, and measured their attitudes after exposure to each of the communications. The data were examined for relationships between initial attitude, emotional response to persuasion, and attitude change.

530. McNulty, J. A., & Walters, R. H. Emotional arousal, conflict, and susceptibility to social influence. Canadian Journal of Psychology, 1962, 16, 211-220.

Forty high school boys served as Ss in an experiment in which they were required to discuss a controversial topic with two confederates of the experimenters. Half the boys (HA Ss) were given instructions designed to arouse anxiety; the other half were given relaxing instructions (LA Ss). Ten boys in the HA group and ten in the LA group were confronted with opinions that strongly conflicted with their own (argument group); the remaining twenty boys were exposed to relatively neutral opinions (no-argument group).

EMG potentials of Ss in the HA argument subgroup were significantly higher than those in any of the other three subgroups. These Ss also showed the greatest amount of attitude change; thus there was evidence to suggest that emotional arousal may facilitate changes of this kind. On the other hand, it was evident that significant main effects due to the argument variable could not be entirely explained in terms of emotional arousal.

531. Mefferd, R. B., Jr., & Wieland, B. A. Modification in autonomically mediated physiological responses to cold pressor by word associations. Psychophysiology, 1965, 2, 1-9.

Physiological measures; basal skin resistance (BSR), galvanic skin resistance (GSR), electrocardiogram (EKG), and skin temperatures were made on 120 consecutive days on 3 male subjects during rest, a 20-item word association test, recovery, a cold-pressor test, a combination of cold-pressor and a second similar word-association test, and final recovery. Each stimulus alone induced increased sympathetic activity. Ongoing stress (cold pressor) responses, however, were depressed during the word-association test. Furthermore, the nature, reaction times, and commonalities of the associations were influenced by the stress. The inhibition was not due to order, threshold, adaptation, or conditioning effects.

532. Mefferd, R. B., Jr., & Wieland, B. A. Comparison of responses to anticipated stress and stress. Psychosomatic Medicine, 1966, 28, 795-806.

Baseline measurements of autonomic, metabolic, and psychological processes of young men were compared with their responses to anticipated hypoxia and hypoxia. Relative to their baseline levels, the subjects reacted differently to the anticipated stress--some reacted hardly at all, while others had an alarm reaction. Upon actual exposure to hypoxia (except for those compensatory adaptations specific to hypoxia) these general responses simply increased in magnitude in all subjects, i.e., they maintained their rank-order positions during the stress. Such suggests that the physiological response accompanying anxiety is a dimension of individual differences apart from that of the perceptual-experiential response.

533. Mertesdorf, F., Lueck, H. E., & Timaeus, E. Heart rate in an Asch-type conformity situation. Perceptual and Motor Skills, 1969, 29, 565-566.

In an Asch-type conformity experiment conformists and nonconformists showed in some sense different conflict resolution behavior measured by heart rate. As predicted there was a reverse U-shaped trend for conformist and a monotonic trend for non-conformists; although unpredicted, a monotonic component for conformists and a bitonic component for nonconformists was also existent.

534. Miller, L. H. The bidimensional nature of the galvanic skin response. (Doctoral dissertation, Duke University) Ann Arbor, Mich.: University Microfilms, 1967. No. 68-2730.

All subjects were rested for the ten minutes of Period 1. While responses were recorded following this initial resting period, one-half of the males and one-half of the females were threatened with electric shock and their responses recorded for a second ten minute period. The other one-half of the subjects continued to rest during Period 2 serving as controls for the Stress group. One-half of the Stress group and one-half of the Non-Stress groups were then presented with a concept formation test via lantern slides. The other one-half of the subjects were presented with the same slides but in random order with instructions to view them passively. Following this condition of Active or Passive Regard, all subjects were again rested for a third ten minute period during which their responses were recorded.

Stress groups showed a generalized increase in sympathetic activity with all parameters of GSR activity, Mean Heart Rate, and Mean Pulse Wave discriminating between the Stress and Non-Stress groups during Period 2. Only Base Potential, Base Conductance, and Mean Pulse Wave served to discriminate between the Active and Passive Regard groups during Period 3.

535. Miller, L. H., & Shmavonian, B. M. Replicability of two GSR indices as a function of stress and cognitive activity. Journal of Personality and Social Psychology, 1965, 2, 753-756.

A replication of an experiment by Katkin in which 2 GSR indices, non-specific activity and basal skin resistance, were found to vary independently as a function of experimental conditions was conducted. An attempt to explicate the nature of the psychological dimensions underlying the phenomena was made by adding a noninterview control group to Katkin's design. The 4 groups in the 2 x 2 factorial design were: stress/interview, nonstress/interview, stress/noninterview, and nonstress/noninterview. The divergence of GSR nonspecifics and basal skin resistance previously reported by Katkin was reproduced for the stress groups. There were no significant differences between interview and noninterview groups. It was concluded that the changes following the interview could not be attributed solely to the interview.

536. Miller, W. C., III. An experimental study of the relationship of film movement and emotional involvement response, and its effect on learning and attitude formation. (Doctoral dissertation, University of Southern California) Ann Arbor, Mich.: University Microfilms, 1967. No. 68-7193.

This study was designed to test whether film motion--a salient formal property of the motion pictures--can, of itself, produce audience response. Response was measured by the galvanic skin response (GSR), by an information retention test, and by two attitude measures--the semantic differential pre- and post- evaluative measures of attitude change, and a Likert-type attitude questionnaire. This study was especially interested in the GSR as a tool for communication and artistic measurement.

There were four treatment groups of 20 subjects each. (Subjects were primarily college students and adults.) One group saw a normal motion picture. A second group saw a filmograph (still pictures) made from the film. The third and fourth groups saw mixed treatments--one-half motion pictures, one-half filmograph, and conversely, to test for possible order effects.

Results of the above tests indicate only that the motion group scored significantly higher on attitude ratings of the film (excluding the semantic differential attitude change measures) than did the filmograph group. Few other measures were significant, and these were more than likely chance results to be expected from the number of tests performed. It was concluded from these tests that a generalized statement of the positive effects of motion on a film audience is true only with respect to their attitude about the film and its content. However, trends on important GSR measures indicate that motion groups did score higher, a difference which might be significantly detected by additional testing.

537. Mittelman, B., & Wolff, H. G. Affective states and skin temperature: Experimental study of subjects with "cold hands" and Raynaud's syndrome. Psychosomatic Medicine, 1939, 1, 271-292.

The emotional changes that were accompanied by a fall in the skin temperature of the extremities were always complex, though one or two emotions prevailed. These affective states contained, in different subjects, various degrees of tension, anxiety, guilt, feelings of being pushed and of being thwarted, embarrassment, irritation, anger, rebellion, feelings of inadequacy and of being criticized or disapproved of, insecurity, humiliation, grief, feelings of helplessness, depression, despair and pleasurable excitement. Hence there was no specificity in the quality of the predominant emotion that was accompanied by a fall in the skin temperature of the extremities. Major drops occurred under emotional stress both with and without awareness on the part of the subject of his emotional state. The subject's reaction to a given situation was dependent upon his life experience, his values and his aims. Major drops occurred with a variety of emotional reactions interrelated with life situations that meant a threat to the subject's welfare or were charged for him with conflict.

538. Mittelman, B., & Wolff, H. G. Emotions and skin temperature: Observations on patients during psychotherapeutic (psychoanalytic) interviews. Psychosomatic Medicine, 1943, 5, 211-231.

Cases are cited to illustrate (1) detailed correlation between finger temperature and conscious emotional swings characteristic of the responsive personality type, (2) variations in finger temperature according to emotional orientation reflected in dreams, (3) variations following disturbing changes in life situations, (4) high finger temperature through replacement of hostility with facetiousness and sexual excitement, and (5) variations with reactions to current stress and revived memory patterns--personality type with high ideals and repressed emotions. "In broadest terms vasoconstriction (fall in temperature) in the fingers is correlated with an increase in conflict, while vasodilation (warm hands) is correlated with uninhibited action and increasing emotional security."

539. Mizushima, K. Shippaiji ni okeru hifu denki dendodo to kokyu. (Changes in galvanic skin conductance and respiration resulting from failure experience.) Japanese Journal of Psychology, 1954, 25, 165-173.

The effect of successive failures on galvanic skin conductance was studied with 49 delinquent children. In general, failure tends to decrease conductance during both work and rest, and to slow and deepen breathing with a smaller I-fraction. No correlation was found between IQ or degree of delinquency and the effect of failure. It is suggested that such decrease in physiological activity may be the result of depression and disappointment rather than conflict, which would increase such activity. In Japanese with English summary.

540. Mordkoff, A. M. The relationship between psychological and physiological response to stress. Psychosomatic Medicine, 1964, 26, 135-150.

The relationship between physiological and psychological response to stress, and the conditions under which the degree of relationship could be altered were investigated. An intra-individual methodology was employed in which reports of psychological experience were obtained during a stressor film stimulus in a fashion analogous to the continuous measurement of physiological response. The conditions under which Ss made phenomenal reports were systematically varied within a 3×2^4 factorial design. A substantial relationship was obtained between physiological response and psychological experience. The various physiological variables demonstrated differential correspondence to the ratings of psychological impact. The degree of relationship between psychological and physiological response, quantified by multiple regression analyses of the responses of each S, were remarkably stable in the face of the experimental variations introduced in the experiment.

541. Moroney, W. F. The detection of deception as a function of PGR methodology. (Doctoral dissertation, St. John's University) Ann Arbor, Mich.: University Microfilms, 1968. No. 69-7125.

This investigation is concerned with the effectiveness of a modification of the circuit specified by Stewart and the applicability of the circuit in lie detection situations. Essentially, the comparative effectiveness of the traditional dc coupled bridge circuit and the modified ac coupled circuit was determined. The comparative effectiveness of the traditional lie detection procedures--association, relevant-irrelevant and peak-of-tension was also investigated. Two detection paradigms--guilty information paradigm and the guilty person paradigm--were used.

Under all the recording conditions, except the second peak-of-tension trial, more correct identifications were made than would have been made on a chance basis. On the basis of the analyses of the data the following were concluded: 1) The ac coupling technique and the dc coupling technique were equally effective under the lie detection procedures common to this investigation; 2) The most effective procedure was the relevant-irrelevant procedure. More correct identifications of the critical item were made when words were used as stimuli under the relevant irrelevant procedure than when numbers were used as the critical item; 3) On the whole, the association procedure was more effective than the peak-of-tension procedure; 4) Knowledge of the gradual changes in resistance did not appear to be essential to the correct identification of the critical item under the peak-of-tension condition.

542. Morris, L. W., & Liebert, R. M. The relationship of cognitive and emotional components of test anxiety to physiological arousal and academic performance. Journal of Consulting and Clinical Psychology, in press.

The relationship of cognitive (Worry) and emotional (Emotionality) components of test anxiety to pulse rate, performance expectancy, and actual examination grades was determined for samples of both high school and college students. For both samples, two of the three major predictions received support: (1) Worry was found to be more highly negatively related to examination grades than was Emotionality or pulse rate and (2) Worry was more highly negatively related to expectancy than was Emotionality. However, pulse rate was no more highly related to Emotionality than to Worry, suggesting that questionnaire and direct measures of autonomic arousal are less closely related than has been generally assumed.

543. Mulholland, T., & Davis, E. Electroencephalographic activation: Nonspecific habituation by verbal stimuli. Science, 1966, 152, 1104-1106.

A decrease in the duration of the electroencephalographic activation response to a series of different words: emotional, "neutral," and scrambled occurred. The response to "neutral" words was consistently briefer than that to the other words. This result is evidence of a nonspecific habituation of activation, which implies that habituation to classes of stimuli can occur.

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544. Nelson, J. T., & Epstein, S. Relationships among three measures of conflict over hostility. Journal of Consulting Psychology, 1962, 26, 345-350.

Ss who produce a hostile response to a picture of low relevance but not to one of high relevance give different responses for both GSR and reaction time than controls when tested with neutral, medium, and highly hostile words. There is a relationship between production of hostile responses to pictures of low relevance and magnitude of GSR.

545. Niimi, Y., Hashimoto, H., Mochizuki, K., & Ohno, I. Galvanic skin responses during Rorschach test administration. Japanese Journal of Psychology, 1956, 27, 175-184.

Psychotics, as compared with normals, showed marked increases in GSR to cards VI-X, differences that did not appear when non-Rorschach color stimuli were used. The position of the Rorschach card in the series was also found to be a significant factor.

546. Nomikos, M. S., Opton, E., Jr., Averill, J. R., & Lazarus, R. S. Surprise versus suspense in the production of stress reaction. Journal of Personality and Social Psychology, 1968, 8, 204-208.

The purpose of this experiment was to investigate the relationship between duration of harm anticipation and magnitude of the associated stress response. Two versions of a film portraying three wood-mill accidents were constructed. In the short anticipation, or "surprise" version, the 1st two accidents occurred virtually without warning; in the long anticipation, or "suspense" version, they were preceded by 20-30 sec. of clue-furnishing scenes. Results indicated that long anticipation was more stressful than short anticipation, consistently producing higher levels of autonomic disturbance. Moreover, most of the physiological stress reaction occurred during the periods of anticipation, rather than during the actual confrontations with accident scenes.

547. Notterman, J. M., Schoenfeld, W. N., & Bersh, P. J. Conditioned heart rate response in human beings during experimental anxiety. Journal of Comparative and Physiological Psychology, 1952, 45, 1-8.

An experiment is reported which deals with a technique for establishing a conditioned heart rate response in human beings.

Evidence is presented to show that, by means of the described technique, a previously ineffective stimulus (tone) acquired the power of exercising a depressant effect upon the heart rate, following the pairing of that stimulus with electric shock. Some characteristics of this conditioned response are exhibited in terms of its initial conditioning and subsequent extinction, spontaneous recovery, reconditioning, and second extinction.

548. Novak, S., Hayes, R., Goodman, J., & Welch, L. The effect of an avoidance situation on the psychogalvanic response. Journal of Psychology, 1955, 40, 307-311.

The hypothesis was tested to see if lower palmar skin resistance levels and greater magnitude in PGR may be elicited by threat of an avoidable aversive stimulus than with threat of an unavoidable one. Twenty-seven S's in two groups were tested in a mock reaction time situation, the avoidance group being told that faster reaction time in pressing a lever would spare them from hearing a threatened claxon horn, the other group told simply that it would be sounded. There was an increase in PGR to the avoidable threat instructions, significant at the .01 level.

549. Nowlin, J. B., Eisdorfer, C., Bogdonoff, M. D., & Nichols, C. R. Physiologic response to active and passive participation in a two-person interaction. Psychosomatic Medicine, 1968, 30, 87-94.

Physiologic response has been assessed in a two-person interaction where one of the two participants coped actively with a challenging situation, the other participant assuming a passive observer's role. The experimental challenge was that of responding aloud to a set of standardized interview questions; physiologic parameters considered were those of plasma free fatty acid (FFA) concentration and heart rate. Irrespective of whether the individual was an active or passive participant, the interview situation evoked a marked rise in plasma FFA and heart rate in both volunteers. The possibility was considered that this response might reflect a physiologic counterpart to the transactional process of empathy.

550. Nowlis, D. P., & Kamiya, J. The control of electroencephalographic alpha rhythms through auditory feedback and the associated mental activity. Psychophysiology, 1970, 6, 476-484.

Twenty-six subjects were given baseline tests for electroencephalographic (EEG) alpha rhythm presence, and then a period of fifteen minutes to gain insight into mental activity associated with alpha presence and absence, while provided with an auditory feedback loop keyed to the presence of alpha. Sixteen of the subjects worked with eyes closed, and ten, with very high initial alpha baseline scores, worked with eyes open. After the fifteen minute practice period permitting control of alpha through feedback, the subjects were given a trial during which they attempted to produce as much alpha as possible and a trial in which they tried to produce as little as possible. The results indicated significant appropriate change for both the generation and suppression trials. Those who were able to control alpha spontaneously reported mental states reflecting relaxation, "letting go," and pleasant affect associated with maintaining alpha.

551. Nunnally, J. C., Knott, P. D., Duchnowski, A., & Parker, R. Pupillary response as a general measure of activation. Perception and Psychophysics, 1967, 2, 149-155.

Pupil size was measured while 30 male college students undertook five tasks respectively concerning (a) muscle tension induced by the lifting of weights, (b) fear induced by threat of a gunshot, (c) intense stimulation induced by loud pure tones, (d) heightened attention from viewing novel pictures, and (e) pleasantness and unpleasantness in reaction to pictures that differed in terms of their affect-inducing characteristics. Highly regular relationships were found between pupil size and degree of muscle strain and between pupil size and the temporal ordering of events during threat of a gunshot. Significant effects on pupil size also were found for the other three types of stimulation.

552. Obrist, P. A. Heart rate and somatic-motor coupling during classical aversive conditioning in humans. Journal of Experimental Psychology, 1968, 77, 180-193.

Three experiments are reported which provide evidence that anticipatory cardiac changes in human Ss during classical aversive conditioning are coincident with the modification of somatic-motor activity. With a 7.0-sec. ISI, both cardiac activity and bursts of EMG activity measured from three muscle groups are attenuated at about the time the UCS is expected. When respiratory activity is not controlled under these conditions, both the frequency and the magnitude of respiration are similarly attenuated. When the ISI is shortened to 1.0 sec., the acceleration of heart rate, observed on test trials to follow a small deceleratory response, is associated with an increase in EMG and respiratory activity. These data are considered to be consistent with an hypothesis which views cardiac and somatic-motor events as different aspects of the same response process. Implications of this position for behavioral processes are discussed.

553. Obrist, P. A., Webb, R. A., & Sutterer, J. R. Heart rate and somatic changes during aversive conditioning and a simple reaction time task. Psychophysiology, 1969, 5, 696-723.

Four experiments are reported, all of which are concerned with evaluating in human Ss the relationship between the deceleration of heart rate, observed to anticipate both aversive and non-aversive stimuli, and several aspects of somatic-motor activity. In a simple reaction time task, a decrease in spontaneous bursts of EMG activity and both respiration amplitude and frequency were found to be concomitant with the deceleration of heart rate during the foreperiod and to be directly correlated with reaction time. The decrease in anticipatory somatic activity to an aversive stimulus was found in a second experiment to extend to spontaneous eye movements and blinks, which also had a marked concomitance with the anticipatory deceleration of heart rate. However, experimentally imposed somatic activity, i.e., continuous finger tapping, increased in intensity around the time the UCS was expected. A third experiment provided additional evidence that the anticipatory cardiac deceleration to aversive stimuli was not mediated significantly by respiratory maneuvers. Finally, evidence was provided that the basis for the spontaneous EMG bursts may be related to somatic responses elsewhere in the body, such as postural adjustments.

554. Oken, D. An experimental study of suppressed anger and blood pressure. A.M.A. Archives of General Psychiatry, 1960, 2, 441-456.

The present report describes some studies of the emotional responses evoked by a stressful interview and of the relation between these and concomitant cardiovascular changes. A four-day design was used, including an initial prestress day and three days in which the central event was a psychiatric interview designed to evoke an affective response. On the first day an attempt was made to stimulate anxiety specifically; on the second day anger, and on the third day a nonspecific communication blocking technique was used. Subjects were a mixed group of 10 normotensive psychiatric patients. Affect responses were quantified, using rating scales for consciously experienced anxiety, anger, and depression (previously developed and found reliable) based on continuous observation behind a one-way mirror, as well as an evaluation interview. Ratings were made for each of 10 periods: the prestress day and before, during, and after the stress, on the succeeding three days. Blood pressure and heart rate measured continuously, were averaged for each of the 10 periods and related to the corresponding affect ratings.

555. Oken, D. "Tension," stress and self-control. Psychosomatics, 1964, 5, 3-6.

Although anxiety and muscle tension are related, it seems clear that the situation is far more complex than a simple one-to-one correlation. Evidence has been provided that a particular character structure, in which self control plays a central part, is associated with chronic muscular hypertension. Consideration of muscle tension as a total psychosomatic state is important. Patients cannot be treated as if they were merely collections of tense muscles. Only by clarifying the basic psychophysiology of the neuromuscular apparatus can we develop an understanding of the etiology and rational treatment of symptoms due to muscle tension.

556. Oken, D. The psychophysiology and psychoendocrinology of stress and emotion. In M. H. Appley & R. Trumbull (Eds.), Psychological stress. Issues in research. New York: Appleton-Century-Crofts, 1967. Pp. 43-76.

While the main focus of this review is on the physiological correlates of stress, there is some discussion of attitude relevant material. e.g., some attention is given to the correlates of positive and negative affect in film viewing situations.

557. Oken, D., Grinker, R. R., Heath, H. A., Herz, M., Korchin, S. J., Sabshin, M., & Schwartz, N. B. Relation of physiological response to affect expression: Including studies of autonomic response specificity. Archives of General Psychiatry, 1962, 6, 336-351.

Two groups each of nine high and low affective lability, range, and threshold, normal college students showed no significant difference on nine physiological variables and three affective and three defensive psychiatric response categories in a psychological stress, a physical stress, and a control situation. "The hypothesis that the affectively less expressive subjects would manifest greater physiological responses generally was not substantiated." Small differences between the groups appeared in GSR, diastolic blood pressure, finger blood flow, and finger-skin temperature.

558. Olivos, G. Response delay, psychophysiological activation, and recognition of one's own voice. Psychosomatic Medicine, 1967, 29, 433-440.

One hundred and ten subjects were confronted with the verbal discriminatory task of differentiating their own voices from those of other people. The Ss were asked to delay their verbal report for 12 sec., while GSR, GSP, and EEG were recorded. A significantly larger number of Ss in the experiment recognized their own voices as compared to the results obtained by other experimenters who requested an immediate verbal report from their Ss. A year later 65 of the original 110 Ss were confronted with the same task but requested to give their report immediately after listening to the recorded voices. The results supported the hypothesis that allowing time for the autonomic reaction to reach a maximum improves the Ss' identification of their own voices. A significantly different physiological response was observed when the Ss listened to their own voices as compared to listening to the voices of other people.

559. Opton, E. M., Jr., & Lazarus, R. S. Personality determinants of psychophysiological response to stress: A theoretical analysis and an experiment. Journal of Personality and Social Psychology, 1967, 6, 291-303.

Personality correlates of psychological and physiological response to two different laboratory stressors were sought. Item analysis of a 795-item personality inventory revealed 131 discriminating items in an ipsative (intraindividual) design. Subjects who responded relatively more strongly to a threatening motion-picture film than to threat of electric shock described themselves as lacking in impulse expression, socially inhibited, introverted, submissive, suggestible or obedient, insecure, passive, anxious, and not caring about friends. Subjects who responded more strongly to threat of shock than to the movie attributed the opposite qualities to themselves. Normative (interindividual) analyses (high response to film compared to low response to film, high response to shock compared to low response to shock) found no more discriminating personality items than would be expected by chance. Both the results of this experiment and a theoretical analysis of the problem indicate that ipsative research designs can control much of the extraneous variance which probably is responsible for the weak and ephemeral relationships between personality and psychophysiological response commonly found in studies using normative designs.

560. Orne, M. T., & Thackray, R. I. Group GSR technique in the detection of deception. Perceptual and Motor Skills, 1967, 25, 809-816.

A technique to average GSR across Ss is proposed to facilitate detection of deception. Differential responsivity to "lie" vs "neutral" stimuli is augmented by averaging out idiosyncratic responses to neutral stimuli. Its feasibility was demonstrated by recording individual and group GSRs of Ss questioned in small groups. The probability of detecting shared information was greatly increased. Limitations and possible applications of the technique are discussed.

561. Ort, R. S. Eye reaction as an indicator of emotion. Indiana Academy of Science (Proceedings), 1950, 59, 289-290.

Eye movements were recorded during the administration of a word association test, using loaded and non-loaded words, to 32 subjects. Loaded words were found to be accompanied by eye-reaction in 79.74% of the cases. Author concludes that "involuntary eye-movement is a more sensitive indicator of emotion than any of the customarily used complex indicators."

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562. Paintal, A. S. A comparison of the galvanic skin responses of normals and psychotics. Journal of Experimental Psychology, 1951, 41, 425-428.

1. The galvanic skin responses of 450 normals and 450 psychotics to faradic shock and threat of shock have been compared.

2. The results show that the physiological mechanism responsible for giving rise to the GSR to shock is not impaired in psychotics. However, there was markedly less response to threat of shock in psychotics than in normal Ss.

3. It is suggested that the value of a GSR should be judged with reference to the maximum response obtained in an individual, since in itself the GSR is often misleading. Further, by expressing a GSR as a percentage of the maximum response, conversion of the raw data into derived measures can be dispensed with.

563. Paivio, A., & Simpson, H. M. The effect of word abstractness and pleasantness on pupil size during an imagery task. Psychonomic Science, 1966, 5, 55-56.

Findings from two studies demonstrate that a S's pupils dilate when he attempts to generate mental images to words. Dilation, which may reflect the cognitive difficulty of the imagery task, was greater to abstract than to concrete words, but did not vary with word pleasantness-unpleasantness.

564. Partington, J. T., & Colman, F. D. Physiological and psychological correlates of personality impression formation. Psychonomic Science, 1969, 17, 369-371.

This preliminary study of strategies involved in personality-impression formation utilized complex stimuli and novel dependent variables, including pupillary activity, syntactic features of verbalizations, and multidimensional trait ratings. Two recurring strategies were found that appear to reflect different degrees of conceptual complexity. Interpretations based on observed contiguous associations between pupillary activity and stimulus information were supported by correlational evidence from the verbalizations and trait ratings.

565. Pastukhina, R. I., & Vikhriova, M. P. Changes in cardiac activity under high emotional stress. Bulletin of Experimental Biology and Medicine, 1968, 66, 835-836.

Radiotelemetric recording of the pulse rate and electrocardiogram of 30 students during examination; revealed an increase in the pulse rate, increase in amplitude of the R and T waves, and an increase in the systolic index. Flattening of the T wave was observed in 7 students.

566. Patterson, E. A qualitative and quantitative study of the emotion of surprise. Psychological Monographs, 1930, 40 (Whole No. 181).

By the use of the galvanometer and the Wheatstone bridge, supplemented by introspective notes, the intensity and quality of surprise and related emotions were studied. The data indicated that the extent of the galvanic reflex could be reliably used as a partial measure of the intensity of the feeling produced, but did not indicate the nature of the feeling aroused. Surprise could not be clearly distinguished from other emotions. Subjectively surprise seems to be more ideational and more free from organic components than fear or startle.

567. Patton, G. W. Interstressor consistency of subject differences in autonomic activity. Journal of Psychology, 1969, 72, 199-209.

Attempted to determine whether consistent intersubject differences in sympathetic nervous system (SNS) activity appear during a number of thermal and non-thermal stress situations. Twenty-four male adults were classified as sympathetic or parasympathetic according to their autonomic balance scores and were then exposed to one nonstress (comedy movie) and four independent stress conditions (cold, heat, anagrams, and films of surgery), while recordings were taken of pulse rate, systolic blood pressure, palmar skin conductance, and instep temperature. Regardless of the autonomic measure involved, rank orderings of Ss tended to remain consistent across stressors, and, correspondingly, sympathetic Ss generally displayed greater SNS activity than parasympathetic Ss. The origins of differences between sympathetic and parasympathetic Ss were also analyzed and discussed.

568. Paul, G. L. Inhibition of physiological response to stressful imagery by relaxation training and hypnotically suggested relaxation. Behaviour Research and Therapy, 1960, 7, 249-256.

The results of the present study add further support to the growing body of evidence in favor of response suppression or modified counterconditioning as the major mode of operation in systematic desensitization therapy, in addition to nonspecific factors present in most therapeutic encounters. Such data regarding the modifiability of response to the imaginal representation of anxiety-eliciting stimuli is crucial, even if "in vivo" desensitization procedures should be found to be as effective as systematic desensitization, since, excluding a few phobic reactions to concrete objects, the broad range of anxiety-eliciting configurations presented for treatment cannot be therapeutically manipulated in real-life.

569. Paul, G. L. Extraversion, emotionality, and physiological response to relaxation training and hypnotic suggestion. International Journal of Clinical and Experimental Hypnosis, 1969, 17, 89-98.

Examined the possible predictive relationship of extraversion and emotionality, singly and combined into H. J. Eysenck's 4-fold classification, for differential cognitive and physiological responsiveness to relaxation training, hypnotic suggestion, and a self-relaxation control procedure, and to the degree of inhibition of the physiological response to stressful imagery resulting from the treatment procedures. Sixty unselected female Ss, covering the full range on both personality scales, participated in two experimental sessions, one week apart. Nonsignificant relationships were found between the personality characteristics and the previously reported individual or combined response to treatment procedures.

570. Pearson, D. W., & Thackray, R. I. Consistency of performance change and autonomic response as a function of expressed attitude toward a specific stress situation. Psychophysiology, 1970, 6, 561-568.

A persistent problem in stress research has been that some individuals may show impairment, while others show improvement or no change in performance under stress. Attempts to relate this variance in performance to general anxiety or other personality variables have generally not been too successful. Based upon responses to a fear of shock item in an attitude questionnaire, Ss were classified as "high fear of shock" or "low fear of shock" types. Half of the Ss in each group were assigned a perceptual-motor task; the others were assigned a cognitive-interference task. After training, all Ss were informed that they would be required to maintain their training performance levels in a situation in which they would be shocked if performance declined. Performance and heart rate measures taken during training were compared with the same measures taken under the threat-of-shock conditions. Results indicate significant differences between groups in both performance and physiological activity with "high fear of shock" Ss exhibiting relatively greater performance impairment and increased heart rate.

571. Peavler, W. S., & McLaughlin, J. P. The question of stimulus content and pupil size. Psychonomic Science, 1967, 8, 505-506.

Evidence indicated that dilation can be produced, even in the presence of increased luminance, provided the stimulus is sufficiently arousing or novel. The results from a second study failed to support the hypothesis that pupil size is systematically related to rated affect of visually presented words. Possible artifacts of measurement are discussed.

572. Persky, H., Hamburg, D. A., Basowitz, H., Grinker, R. R., Sabshin, M., Korchin, S. J., Herz, M., Board, F. A., & Heath, H. A. Relation of emotional responses and changes in plasma hydrocortisone level after stressful interview. A.M.A. Archives of Neurology and Psychiatry, 1958, 79, 434-447.

By physiological and psychological study of the effects of a stressful interview (using 22 "anxiety-prone" psychiatric patients as Ss) it was found that there was "a significant association between emotional response to psychological stress and change in plasma hydrocortisone level. While the relationships reported are ... not extreme nor dramatic they are quite consistent ... It would appear that the plasma level of hydrocortisone is increased by any type of emotional arousal These findings are of special interest because this experiment included only a moderate range of emotional responses. The limited data available on more extreme responses suggest that an even greater degree of adrenocortical activation occurs."

573. Persky, H., Zuckerman, M., & Curtis, G. C. Endocrine function in emotionally disturbed and normal men. Journal of Nervous and Mental Disease, 1968, 146, 488-497.

Affect and endocrine variables were measured in groups of psychiatric patients and normal control subjects. The two groups differed significantly on both sets of variables. Affect-endocrine relationships were assessed by multivariate statistical techniques. A group of adrenocortical variables were found to be related to a psychological affect factor composed of interview ratings and test measures of anxiety and depression. Three pituitary hormones, LATS, FSH, and LH, were less strongly related to a second psychological factor, which consisted of projective test expressions of affect.

574. Peterson, F. The galvanometer as a measurer of emotions. British Medical Journal 1907, 2, 804-805. (Abstract)

The emotional disturbance persists for an uncertain period in the pneumographic curve, whereas the galvanometer wave quickly subsides with the fall of the emotion. The galvanometer is a measurer of acute emotional tone, and is beyond the control of the will. This instrument registers emotional conditions in the subconscious or unconscious spheres. Sometimes, with very labile emotions, there were marked fluctuations in the galvanometer curves, while the respiratory curve would be regular and even. On the other hand, with rather an even galvanometer curve, there may be abrupt deviations in the respiratory curve.

575. Peterson, F., & Jung, C. G. Psycho-physical investigations with the galvanometer and pneumograph in normal and insane individuals. Brain, 1907, 30, 153-218.

This article covers the following areas:

Chapter I.—The Apparatus Employed.

Chapter II.—The Physics and Physiology of the Psycho-physical Galvanic Reflex.

1.—Fluctuations of the Galvanometer from Physical Causes.

2.—Fluctuations of the Galvanometer from Psychic Causes in Normal Individuals

Chapter III.—The Pneumograph as an Indicator of Psychic Processes.

Chapter IV.—The Galvanometer and Pneumographic Curves in Dementia Praecox.

Chapter V.—Association Experiments.

1.—The results of Association Tests.

2.—Résumé of the Tests with Word-associations in Normal Individuals.

3.—Word-associations in Dementia Praecox.

576. Pfeiffer, J. B., Jr., & Wolff, H. G. Studies in renal circulation during periods of life stress and accompanying emotional reactions in subjects with and without essential hypertension; observations on the role of neural activity in regulation of renal blood flow. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 929-953.

1. Renal blood flow and filtration rate were studied in thirty-five subjects with and without arterial hypertension during periods of elevation in both systolic and diastolic blood pressure induced by discussion of important personal topics having a threatening significance.

2. During such rises in blood pressure, there was a constant fall in effective renal blood flow and rise in filtration fraction, indicating an increase in the resistance offered by the renal arterioles.

3. The changes in renal blood flow, filtration fraction and vascular resistance were similar in direction in both the hypertensive and normotensive groups. There was an indication that the decrease in renal blood flow and filtration fraction was more severe in the hypertensive group. The increase in renal vascular resistance was unequivocally greater in the hypertensive group.

577. Phillips, L. W. Mediated verbal similarity as a determinant of the generalization of a conditioned GSR. Journal of Experimental Psychology, 1958, 55, 56-62.

Five Turkish words were paired with five neutral Munsell colors constituting a brightness scale. Twenty-one Ss were trained to associate words and colors to a criterion of 100% over-learning beyond three perfect recitations of the pairs. The Ss were then conditioned to the word which had previously been learned as a paired associate to the dark extreme of the brightness scale. For conditioning, a loud, pure tone was paired with the stimulus word, and GSR was measured. The CS word and the other words in the series were then tested for GSR without the tone. After conditioning the words were presented randomly and first associations were recorded.

The results indicate that a mediated verbal similarity scale was established, and that the generalization gradient over the major part of this dimension was a decreasing function of the distance of the test stimulus from the CS.

578. Pillard, R. C., Carpenter, J., Atkinson, K. W., & Fisher, S. Palmar sweat prints and self-ratings as measures of film-induced anxiety. Perceptual and Motor Skills, 1966, 23, 771-777.

To observe the response to an affect-arousing film, a palmar sweat print and self-ratings of anxiety and sweat-output were taken from 14 Ss, once before and once during a film believed to induce "anxiety." Ss showed significantly darker sweat prints and reported more anxiety during the film. The increase in palmar sweat appears to correlate moderately with both of the self-ratings. This finding is compared with similar relationships obtained by Lazarus and his co-workers. Some difficulties in the measurement of psychophysiological variables are discussed.

579. Pishkin, V., & Shurley, J. T. Electrodermal and electromyographic parameters in concept identification. Psychophysiology, 1968, 5, 112-118.

This study examined concept identification (CI) performance as a function of physiological arousal and physiological activity as a function of task complexity and expectation of success or failure. The development of an unsolvable set constituted stresses used to manipulate arousal. Results showed the following: (1) a positive correlation between CI errors and muscle action potential (MAP). (2) a negative correlation between spontaneous GSRs and MAP, (3) a greater number of spontaneous GSRs in low complexity-solvable set CI as compared with high complexity problems, (4) progressively improving CI performance in low complexity-solvable set problems, (5) increase in MAPs with high complexity-unsolvable set CI. These findings were interpreted as indicating that MAP reflects internal disturbance associated with inability to process information while spontaneous GSRs reflect successful information intake.

580. Pishkin, V., & Shurley, J. T. Extinction of conditioned electrodermal changes and human information processing. Psychonomic Science, 1969, 16, 86-87.

An inhibitory effect of information load upon extinction of GSR of humans was reliably demonstrated. Antecedent failure on concept identification task reduced extinction rate of GSR as did complexity of a concomitant problem, in terms of bits of irrelevant information. Theoretical formulations regarding interaction of autonomic and cognitive functions in humans, in terms of Spence's inhibitory set and cybernetic aspects of the brain, were postulated.

581. Plutchik, R., & Ax, A. F. A critique of determinants of emotional state by Schachter and Singer (1962). Psychophysiology, 1967, 4, 79-82.

The paper by Schachter and Singer (1962) on "determinants of emotional state" is criticized on the grounds that (a) levels of arousal were not the same for the different conditions compared; (b) the placebo groups were consistently not significantly different from the control groups on the various measures of emotional states; (c) the self-report indices were inadequate as measuring instruments; (d) a double-blind procedure was not used; and (e) there is a marked overgeneralization on the basis of very limited samplings of conditions, emotions, arousal states and types of subjects.

582. Polt, J. M., & Hess, E. H. Changes in pupil size to visually presented words. Psychonomic Science, 1968, 12, 389-390.

The pupil response of 15 male and female Ss was recorded to four visually presented words. Sex differences were found in the pupil response, particularly in regard to response magnitude. Analysis of the individual response showed wide differences, from extreme dilation (34.5%) to constriction (15.3%) to a particular stimulus with a particular S.

583. Popek, K., Vagner, B., & Dostal, J. Untersuchung der Beziehung beider Signalsysteme des Menschen mittels der Suggestion unter Benutzung der Amplitudeänderungen der Herzkontraktionen als Indikator. (Investigation of the relationship between both signal systems in man as indicated by amplitude changes of cardiac contractions under suggestion). Psychiatrie, Neurologie und medizinische Psychologie, 1958, 10, 221-230.

The changes in cardiac amplitude during a suggested 400-yard dash were recorded in 22 young adults. This method revealed the presence and intensity of suggestibility. Pulse rate and heart size which change in the same direction during actual races, responded independently and at times paradoxically under suggestion. The method failed to reveal the relationship of the two signal systems.

584. Porier, G. W., & Lott, A. J. Galvanic skin responses and prejudice. Journal of Personality and Social Psychology, 1967, 5, 253-259.

In this experiment the consistency between the cognitive and emotional components of negative attitudes (prejudice) is investigated. A study by Rankin and Campbell which found greater GSR levels in white Ss to incidental hand contacts by a single Negro E than by a single white E was replicated employing a sample of Negro and white stimulus persons. The California E Scale and Rokeach's Opinionation Scale were used as self-report measures of prejudice. The Rankin and Campbell finding was not reproduced; E Scale scores, but not Opinionation scores, were found to correlate significantly with GSR bias scores. Results are discussed in terms of ethnic prejudice, belief prejudice, and need for employing groups of individuals where person stimuli are used as independent variables.

585. Preston, B. Insurance classifications and drivers' galvanic skin response. Ergonomics, 1959, 12, 437-446.

Drivers' galvanic skin responses were recorded in town traffic and on country roads. Two groups of drivers were compared, those who would pay higher insurance premiums, by reason of their age or occupation, and the rest. The high insurance group did not differ from the rest in the magnitude of the GSR but when the ratio of the GSR in town traffic to that on a country road was considered there was a significant difference such that the high insurance group had a relatively greater GSR on the country road.

It is suggested that in town traffic most of the GSR are generated by the actions of other drivers, whereas on the open road the GSRs are self generated by the subjects' driving. The GSR on the open road will therefore be more affected by the individual method of driving and by the risks the driver takes. The ratio of town GSR to country GSR can be used to eliminate the large unexplained differences between subjects and to expose the differences in driving behaviour.

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586. Rankin, R. E. The galvanic skin response as a physiological measure of social attitudes. Unpublished MA thesis, Ohio State University, 1951.

The present study was an exploration of the galvanic skin response (GSR) as a possible attitude indicator. A group of 40 subjects (White, females) were selected at random from beginning Psychology classes. Two experimenters, one Negro and one White, cooperated in conducting the experiment, which was ostensibly concerned with measuring GSR's to a word association test. Actually however, responses were measured to the touch on the wrist by the two experimenters. These contacts were achieved by the apparent adjustment of a "dummy" apparatus. Four such contacts were made with each subject, two by each experimenter. The total sample was randomly divided into two experimental forms or groups. In Form A the White experimenter conducted the experiment, accommodated the subject, gave the instructions, etc., while in Form B the Negro experimenter performed these duties.

As a further extension of the study, a direct and indirect attitude inventory was given to all beginning classes. It was possible to match 26 of the 40 cases for a comparison of verbal and GSR measures.

The results indicated a highly significant differential response to Negro and White contact. Adaptation to both experimenters was also found to be significant, however adaptation to the White experimenter seemed to be greater. An attempt was made to correlate attitude intensity as displayed on the GSR and the two verbal measures, however, there were no significant results. Several possible reasons for this are discussed and it is suggested that the GSR may be more related to the salience of an attitude than to its intensity. Problems in GSR research are also dealt with in the study.

587. Rankin, R. E., & Campbell, D. T. Galvanic skin-responses to Negro and white experimenters. Journal of Abnormal and Social Psychology, 1955, 51, 30-33.

Forty white male subjects participated in what was nominally a word association test with GSR being recorded. Two Es, one Negro and one white, alternated in making simulated readjustments of a dummy apparatus attached to the S's left wrist, while a right-arm apparatus remained in operation. A highly significant difference in GSR response to the two Es was found. A significant adaptation process was manifested in lessening degrees of response during the successive contacts. An attempt to correlate the degree of differential response to the Negro and white E with direct and indirect attitude tests was weakened by difficulties in matching and timing. The limited results are in general positive, and favor the direct test over the indirect, but are not of clear statistical significance.

588. Raphelson, A. C. The relationships among imaginative, direct verbal, and physiological measures of anxiety in an achievement situation. Journal of Abnormal and Social Psychology, 1957, 54, 13-18.

The relationships among three dispositional measures and two physiological indices of anxiety were investigated. The dispositional measures were low n Achievement, the Mandler-Sarason Test Anxiety Questionnaire, and the Taylor Manifest Anxiety Scale. Skin conductance and respiratory volume were the physiological indices. Twenty-five male college students served as Ss. The correlation between n Achievement and Test Anxiety was $-.43$; between Test Anxiety and Manifest Anxiety, $.53$; and between Achievement and Manifest Anxiety, $-.25$. Need Achievement and Test Anxiety were both related to changes in skin conductance, but the Manifest Anxiety Scale did not relate to conductance change.

589. Raskin, D. C. Semantic conditioning and generalization of autonomic responses. Journal of Experimental Psychology, 1969, 79, 69-76.

Semantic conditioning (SC) and semantic generalization (SG) of GSR and finger vasomotor responses were studied using auditory presentation of stimuli, white noise as the UCS, and a 10-second trace-conditioning procedure. The relationship of the orienting reflex (OR) and anxiety to the development of SC and SG was investigated. Prompting of SG was attempted by manipulating the instructions to Ss and the number of different conditioned stimulus (CS) words used. The results showed clear evidence of SC in both responses, strong SG of the GSR, and some evidence of vasomotor SC. The partially-informative instructions enhanced the SC and SG effects produced with the noncommittal instructions, and the number of different CS words had weak effects on SG. The OR and anxiety had different effects on SC and SG, and there was no evidence of any relationship between OR and anxiety.

590. Ravasini, C. Influence of psychic stimulation upon peripheral vasomotility. An oscillographic and continuous-ter-siographic investigation. Acta Psychoterapeutica et Psychosomatica, 1964, 12, 141-145.

Tests aimed at assessing the magnitude of changes in peripheral motility induced by certain visual and verbal stimuli show that the same stimulation elicits stronger reactions from neurotic Ss than from normal ones, and from normal ones than psychotic ones, the changes induced being greater after submitting Ss to the TAT than to the Rorschach tests.

591. Raven, B. H. The use of the galvanic skin response to investigate semantic generalization of politically toned stimulus words as affected by political attitudes. Unpublished MA thesis, Ohio State University, 1949.

In this study an attempt was made to condition the GSR to a particular point on a scale of political attitudes. After conditioning, other points on the scale were tested for generalization.

592. Rebert, C. S., McAdam, D. W., Knott, J. R., & Irwin, D. A. Slow potential change in human brain related to level of motivation. Journal of Comparative and Physiological Psychology, 1967, 63, 20-23.

Negative slow potential change (contingent negative variation or CNV) in human cortex which develops in the foreperiod of a reaction-time experiment was studied as a function of motivational variables. When the warning signal indicated that a difficult-to-detect auditory stimulus would follow, CNV was greater than when an easily detected stimulus was signaled. Instructing Ss to press a key at the onset of the second stimulus resulted in development of larger anticipatory CNV than when no response was instructed. When muscular effort required to complete a response to the second stimulus was varied, larger CNV accompanied greater effort. These findings extend those of other investigators and support the conclusion that CNV reflects cerebral mechanisms related to motivation.

593. Reiser, M. F., Reeves, R. B., & Armington, J. Effect of variations in laboratory procedure and experimenter upon the ballistocardiogram, blood pressure, and heart rate in healthy young men. Psychosomatic Medicine, 1955, 17, 185-199.

Psychological and physiological (BCG, ECG, heart rate, and arterial blood pressure) responses to the stress associated with experimentation itself have been studied in 48 healthy young soldiers. Two clusters of variables (uncertainty as to the exact nature of the procedure, plus military rank, professional status, experience, and personality of the experimenter) have been separately and independently manipulated. Two "identical" experiments on comparable groups have been carried out; half the subjects were tested by a psychiatrist (Capt. M. C. Experiment I), the other half by a physiologist (Pvt. Experiment II). In each experiment, half the subjects (control subgroup) were reassured as to the benign nature of the procedure immediately upon entry to the laboratory, and half (experimental subgroup) were not given this information until a 10-minute interview which followed a rest period on the BCG table.

In each experiment, experimental and control subgroups could be distinguished on the basis of a statistically significant difference in the mean physiological response to the interview. However, in each experiment the discrimination was related to only one of the functions measured, and this single function differed with the experimenter — amplitude of the BCG in the experiment carried out by the medical officer; mean arterial blood pressure in the experiment carried out by the enlisted man. Appraisal of the sound records revealed a corresponding difference in the total psychological context of the two sets of interviews. These data suggested that the main emotional change during the experimental interviews in Experiment I was relief of uneasiness and tension, whereas the main emotional shift distinguishing the experimental subjects in Experiment II appeared to be the discharge or relief of angry resentful feelings.

594. Reitz, W. E., & Thetford, P. E. Skin potential correlates and rating assessments of self-evaluation under different degrees of awareness. Perceptual and Motor Skills, 1967, 24, 631-638.

Self-evaluation was investigated by having adolescent female Ss rate photographs stereoscopically fused of two strangers (St-St), stranger and self (St-Sf), and two of self (Sf-Sf). Attractiveness and semantic differential ratings were obtained for each stereoscopic composite, and Galvanic Skin Potential (GSP) was monitored during viewing. With self-recognition, GSP was significantly greater for Sf-Sf than for St-St, but without self-recognition of Sf-Sf, GSP showed significantly less change. A tendency for greater GSP was found for St-Sf without self-recognition. Number of Ss rating St-Sf more (1) attractive, (2) highly valued, and (3) active was of borderline significance. Ss not recognizing self under St-Sf condition were high on a measure of self-esteem. Stereoscopically fused faces were rated as more attractive than same two faces normally viewed.

595. Ries, H. A. GSR and breathing amplitude related to emotional reactions to music. Psychonomic Science, 1969, 14, 62-64.

A variety of musical selections was presented to 19 Ss while GSR and respiratory reactions were simultaneously recorded. Ss rated the stimuli in terms of their affective and effective reactions to the music immediately after the presentation of each selection. The results indicated that the GSR was not related to affective reactions to music and was related to effective reactivity only when measures of extroversion-introversion were included. Breathing amplitude was found to be significantly correlated with affective and effective reactivity to the music. It was concluded that this latter measure seemed more promising in this type of research.

596. Rimm, D. C., & Bottrell, J. Four measures of visual imagination. Behaviour Research and Therapy, 1969, 7, 63-69.

The present investigation examined intercorrelations among four measures thought to be related to an individual's ability to imagine visual scenes. The measures included Self-Rating of ability to imagine visual scenes, improvement in paired associate learning when instructed to use visual images as mnemonic aids (Recall Improvement), respiratory changes associated with the imagining of fearful scenes, and a test involving memory for the location of objects in a picture (Picture Memory). Significant correlations were obtained between Self-Rating and respiratory change, Picture Memory and respiratory change, and Picture Memory and Recall Improvement. The value of Self-Rating and Picture Memory as prognostic devices for desensitization was discussed, and it was concluded that Picture Memory may prove to be the superior of the two.

597. Rimm, D. C., & Litvak, S. B. Self-verbalization and emotional arousal. Journal of Abnormal Psychology, 1969, 74, 181-187.

The present experiment investigated certain assumptions derived from Ellis' theory relating implicit verbalization to emotional arousal. Emotional responses (galvanic skin response and respiration changes) of Ss instructed to silently read sequences of affectively loaded sentences were compared with those of Ss who read neutral sentences. The relationship between relevance to S of the content of the sentences and level of emotional response was also investigated. In addition, the effect of sentence type (observation, inference, or evaluative conclusion) on level of emotional response was investigated. Results were that Ss showed a significantly greater response to affectively loaded sentences than to neutral sentences on two out of three response measures. Neither relevance nor sentence type were found to have any significant effect. These results were interpreted as offering only partial support for the theory.

598. Robinson, H. M. Science gets the confession. Forum, 1935, 93, 15-18.

Reviews, in a popular manner, a number of lie detection techniques. Included are the use of blood pressure, psychogalvanic response, respiration, and reaction time as indices of guilt and the use of scopolamin to elicit truthful responses to questions.

599. Robinson, J. O. A study of the relationship between blood pressure and certain aspects of personality. Bulletin of the British Psychological Society, 1959, 37, 5A. (Abstract)

The Pneumoconiosis Research Unit of Llandough Hospital had begun a series of surveys designed to follow the changes of blood pressure of a group of people randomly selected from the population of the Rhondda Fach. At the time of the second survey a group of personality measures was administered. Analysis, although not complete, shows no significant relationship between blood pressure and the test results for the group as a whole.

600. Roessler, R. Personality correlates of heart rate and skin conductance responses to stressor and bland films. Paper presented at the meeting of the Society for Psychophysiological Research, Washington, October 1968.

Twenty young male subjects (Ss) observed a stressor motion picture (previously used by Lazarus et al.) and a bland nature film while heart rate (HR) and skin conductance (SC) were continuously recorded. The 20 Ss were divided into two groups of 10 high ego strength (Es) Ss and 10 low Es Ss. The groups were balanced for order of film presentation.

The SC data from the stressor film revealed a significant Es groups by time interaction ($p < .01$). The high Es group was characterized by a consistently higher SC level than the low Es group, and showed a greater response to specific accidents in the film than the low Es group. There was no significant difference between Es groups on HR. The pattern of HR response was acceleration in anticipation of the accidents and immediate deceleration following them. There were no significant differences between Es groups on either HR or SC in response to the bland film but both variables showed significant habituation.

601. Roessler, R., Alexander, A. A., & Greenfield, N. S. Ego strength and physiological responsivity: I. The relationship of the Barron Es Scale to skin resistance, finger blood volume, heart rate, and muscle potential responses to sound. Archives of General Psychiatry, 1963, 8, 142-154.

Response magnitudes were greater in high than in middle and low Es groups and group differences were greater near stimulus threshold than near maximum stimulus intensity.

602. Roessler, R., Burch, N. R., & Childers, H. E. Personality and arousal correlates of specific galvanic skin responses. Psychophysiology, 1966, 3, 115-130.

Basal skin resistance (BSR) and galvanic skin responses (GSR) to five intensities of sound and light were recorded on four occasions in 32 student subjects (Ss). These occasions were assumed to include unfamiliarity and basal and real life stress conditions. All Ss completed the MMPI, California Personality Inventory, Wechsler Adult Intelligence Scale, Clyde Mood Scale and Examination Anxiety Scale. GSR amplitude was greater under conditions of unfamiliarity, alertness (by electroencephalographic criteria), and higher intensities of stimulation in both stimulus modalities. It was not greater during the presumed stress period. High ego strength-high Barrier score Ss showed a greater GSR amplitude than low ego strength-low Barrier Ss. Test indices of anxiety generally were not related to GSR amplitude, nor were other personality and mood variables.

603. Roessler, R., & Collins, F. Personality correlates of physiological responses to motion pictures. Psychophysiology, 1970, 6, 732-739.

Skin conductance (SC) and heart rate (HR) responses to rest, to a bland and to a stressor motion picture film were examined in 20 student subjects (Ss). Ss were divided equally into a high ego strength (Es) and a low Es group on the basis of their scores on the Barron scale of the MMPI. These groups were balanced for film presentation order and did not differ significantly on trait anxiety as measured by the Taylor manifest anxiety scale. The Zuckerman multiple affect adjective check list was administered before and after both the stressor and the bland film. High Es Ss were more responsive in SC and HR under all three conditions and showed a greater range of SC values than did low Es Ss. Subjective states paralleled physiological states. High Es Ss reported significantly greater state anxiety than did low Es Ss.

604. Rohrachner, H. Muscular micro-activity ("microvibration") as an indicator of psychological tension. Perceptual and Motor Skills, 1958, 8, 150.

In 50 Ss, MV was measured in three situations: immediately after arrival in the laboratory ("expectation-tension"), after moderate suggestions to relax, and after stress induced by difficult intelligence tests. During relaxation amplitude decreased to 68% of the initial value; in the stress situation it increased to values 48% higher than during relaxation. Frequency remained constant. Considerable individual differences were observed. Emotional tension, too, led to an increase of the amplitude. In 27 Ss amplitudes during relaxation and after announcement of an electric shock were compared. Very high individual variation was found; for 10 Ss the difference was insignificant, but significant in the remaining 17 (with a 49% increase in relaxation amplitude, on the average).

605. Rouke, F. L., & Kubis, J. F. Studies in the detection of deception: I. Determination of guilt or innocence from psychogalvanic (PGR) records of delinquents and non-delinquents. American Psychologist, 1948, 3, 255. (Abstract)

PROBLEM: To determine (1) under what conditions the PGR can be used as a valid index of deception. (2) whether delinquents are less subject to detection in a lie than non-delinquents.

CONCLUSIONS: (1) When the number of records deemed necessary by an experienced examiner were obtained from each subject, the PGR proved a reliable and highly valid index of deception. (2) Although significantly above chance, analyses based on only two records are not sufficiently accurate for practical use. (3) Delinquents are not less subject to detection in a lie than non-delinquents.

606. Rowles, E., & Patrick, J. R. The effect of various stimuli on the basal metabolic rate, the blood pressure and the galvanic reflex in man. Journal of Experimental Psychology, 1934, 17, 847-861.

1. The attachment and operation of the apparatus caused very little rise in metabolism rate over the basal rate.

2. Sensory and ideational stimuli have been shown in all subjects but one to be followed by a definite rise in metabolic rate.

3. This technique failed to get results which show pronounced differential effects between the so-called sensory and ideational stimuli on metabolic rate; although the blood pressure curves show some differential effect in favor of ideational stimuli.

4. Irregular waves of greater amplitude and longer duration than the respiratory waves were obtained in the blood pressure curves during the stimulation. Some of these waves followed specific stimuli of both ideational and sensory nature.

607. Ruckmick, C. A. Affective responses to the motion-picture situation by means of the galvanic technique. Psychological Bulletin, 1933, 30, 712. (Abstract)

This study of the galvanic technique applied to affective reactions to motion pictures uses an analysis of the moving stimulus into "reading-points." The aim was to detect variations in the affective responses of 150 normal individuals ranging from about six years to over 50 years of age; to compare the responses of these normal individuals with 50 patients in a Psychopathic Hospital; and to note the effect of repeated showings of the same motion picture on the temporal course of affective responses in 15 normal individuals.

608. Ruckmick, C. A. Psychology of feeling and emotion. New York: McGraw-Hill, 1936.

This textbook comprises a survey and an attempt at a systematization and evaluation of the theoretical contributions and experimental research on feelings and emotions. Emphasis is placed on the phylogenetic theory of emotion, and correlations are made throughout with experimental work and neurological concepts. Chapter headings are: a survey of the affective life; a historical perspective; the range of the affective life; affection or elementary feeling; the classification of emotions; the James-Lange-Sergi theory; more modern theories of feeling and emotion; a phylogenetic theory of affective life; the facial expression of emotion; other experimental procedures of expression; the electrodermal response; the experimental procedures of impression; qualitative descriptions of feeling and emotion; the pathology of the affective life; the role of feeling and emotion in psychoanalysis; development of feelings and emotions in the child; feelings and emotions in the animal mind; feelings and emotions in the educational program; culture and the affective life. The final chapter constitutes a summary of the entire book, with a statement of conclusions that may be drawn. Name and subject indexes are given.

609. Ruckmick, C. A. The electrodermal response to advertising copy. Psychological Bulletin, 1939, 36, 627. (Abstract)

Responses of the sweat glands were recorded during a three-second exposure of advertising copy. Several series of copy, run with 20 subjects, revealed an internal consistency of data and also gave results which tallied in a general way with choices obtained by the serial procedure of impression.

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610. Safir, M. P. The effect of level of anxiety and threat arousing instructions on cognitive control of the GSR. (Doctoral dissertation, Syracuse University) Ann Arbor, Michigan: University Microfilms, 1968. No. 69-7773.

The experiment was designed to compare the effects of anxiety, which may be aroused by threat of pain (shock) or by experimental situation itself, with threat of failure which was defined as lack of ability to control cognitively the Galvanic Skin Response (GSR). Subjects (Ss) were selected on their Mandler-Sarason Test Anxiety Scale (TAS) score. Sixty Ss formed the High Anxious (HA) and 60 Ss the Low Anxious (LA) groups. No differences were expected between Ss until they received test-threat instructions. All Ss received 30 classical conditioning trials, in which "tense" and "relax" or two nonsense syllables were paired with the onset and offset of shock respectively. Then Ss received either standard or test threat instructions to use the stimuli with which they were trained in the classical conditioning trials as cognitive mediators to help control their GSRs on the instrumental trials. The S had to respond with GSRs on presentation of one light and to inhibit GSRs on presentation of the other light for a total of 20 trials, half of which were respond, half inhibit. Fifteen HA and 15 LA Ss were assigned to each of the conditions generating eight experimental groups: HA -- "tense and relax" (TR) non-threat instructions, HA-TR-threat instructions, HA-nonsense-nonthreat instructions HA-nonsense-threat instructions. LA Ss were assigned to the same four experimental conditions. The type of instrumental trial (respond or inhibit) was a within subject variable. If the S gave a GSR on an inhibit trial or did not give a GSR on a respond trial, she was shocked.

611. Sapira, J. D., & Shapiro, A. P. Pulse rates in human volunteers during frustration and the observation of frustration. Journal of Psychosomatic Research, 1966, 9, 325-329.

Twenty Ss underwent failure stress on the Stroop Color Naming Test. Each was observed by a partner who later did the test with S observing him. Cardiometer readings indicated an average pulse rate rise of 7.3 beats/minute during their "failure" while the O had an average pulse decrease of 4.4 beats/minute.

612. Sattler, J. M. Racial "experimenter effects" in experimentation, testing, interviewing, and psychotherapy. Psychological Bulletin, 1970, 73, 137-160.

A review of studies concerned with the "experimenters'" race indicates the following:

- (a) Physiological responsiveness is affected more by the subjects' racial attitudes than by the experimenters' race.
- (b) White experimenters can impede or enhance Negro college students' performance on tasks, but they are more likely to impede or affect Negro children's performance.
- (c) The experimenters' race affects subjects' picture and doll preferences, but may not influence their scores on intelligence tests and personality measures.
- (d) Positive attitudes toward Negroes can be induced by a Negro experimenter or by a Negro-white experimenter team.
- (e) Respondents give socially desirable responses to interviewers of races other than their own, except when the interviewers occupy a high-status role.
- (f) Negro clients prefer Negro counselors.

Limitations of present knowledge are noted, and directions for future research are suggested.

613. Saul, L. J., Davis, H., & Davis, P. A. Psychological correlations with the electroencephalogram. Psychosomatic Medicine, 1949, 11, 361-376.

Electroencephalograms were recorded at annual intervals on 136 patients in psychoanalysis. Fairly exhaustive analysis of the personality structures, motive forces and emotional lives of the individuals on the basis of life history, present life situations, and dreams were available.

Experimentally we were able to predict with fair accuracy the type of a patient's EEG from information on his life history and personality structure.

614. Savage, R. D. Electro-cerebral activity, extraversion and neuroticism. British Journal of Psychiatry, 1964, 110, 98-100.

This study investigated the relationship between alpha rhythm amplitude, inhibition, extraversion and neuroticism. Twenty subjects were divided into four groups according to their extraversion and neuroticism scores.

It was found that extraversion was significantly related to high alpha amplitude, whilst neuroticism as such did not relate to this measure. An alternative orthogonal breakdown showed that EN was significantly different from En, but the differences between eN and en were not greater than expected by chance.

615. Schachter, J. Pain, fear, and anger in hypertensives and normotensives: A psychophysiological study. Psychosomatic Medicine, 1957, 19, 17-29.

Laboratory study of 48 adult Ss by means of "pain, fear, and anger" stimulating situations indicated that the 18 hypertensive Ss showed increased psychological expression of fear and anger. This finding and other results are discussed in relation to the problem of the physiological specificity of emotional behavior.

616. Schachter, J., Williams, T. A., Rowe, R., Schachter, J. S., & Jameson, J. Personality correlates of physiological reactivity to stress: A study of forty-six college males. American Journal of Psychiatry, 1965, 121, 12-24.

In this study of the relationship between personality and autonomic reactivity to stress, a small group, six out of 46 college students, were outstanding psychologically. They received the highest ratings for Intimacy and Involvement which referred to an overall judgment regarding the degree and quality of healthy intimacy in personal relationships and the extent and nature of involvement and commitment to ideas and activities. They showed the most marked psychophysiological reactivity to laboratory stress, including the fact that while in the threatening situation being free to fantasy led to a rise in their autonomic indicators of anxiety. Other students utilized the fantasy defensively to bind anxiety, and their physiological indicators fell. The small, most reactive group also tended to show superior visual-motor performance.

617. Schachter, S. The interaction of cognitive and physiological determinants of emotional state. In L. Berkowitz (Ed.), Advances in experimental social psychology. Vol. 1. New York: Academic Press, 1964. Pp. 49-80.

Taken together, this body of studies does give strong support to the propositions which generated these experimental tests. Given a state of sympathetic activation, for which no immediately appropriate explanation is available, human subjects can be readily manipulated into states of euphoria, of anger, and of amusement at a movie. Varying the intensity of sympathetic activation serves to vary the intensity of a variety of emotional states in both rat and human subjects. Clearly the line of thought guiding these experiments is modified Jamesianism, for emotion is viewed as visceral activity in interaction with cognitive or situational factors.

Obviously these studies do not rule out the possibility of differences among the emotional states. It is the case, however, that given precisely the same state of epinephrine-induced sympathetic activation, it has been possible, by means of cognitive manipulations, to produce in subjects the very disparate states of euphoria, anger, and amusement at a movie. It may, indeed, be the case that cognitive factors are major determiners of the emotional "labels" we apply to a common state of sympathetic arousal.

618. Schachter, S. The interaction of cognitive and physiological determinants of emotional state. In P. H. Leiderman & D. Shapiro (Eds.), Psychobiological approaches to social behavior. Stanford: Stanford University Press, 1964. Pp. 138-173.

"Let us turn now to the cognitive component of this view of emotion and examine further implications of the formulation. The key cognitive assumption underlying the human experiments described is that "given a state of physiological arousal for which an individual has no immediate explanation, he will label this state and describe his feelings in terms of the cognitions available to him." Obviously, there is implicit in this proposition the motivational notion that a drive exists to evaluate, understand, and label ambiguous body states. I am suggesting that Festinger's theoretical invention -- the "evaluative need" he employs as the conceptual underpinning of his theory of social comparison processes -- is as necessary and useful for an understanding of emotion and the perception of bodily states as it has proven for an understanding of the opinions. Given a new, strange, or ambiguous bodily state, the individual will feel pressures to decide exactly what it is that he feels and to decide how he will label these feelings. In the Schachter and Singer study, the differences between the Epi Ign and Epi Inf conditions would certainly indicate that it is useful to apply this notion of evaluative needs to bodily states."

619. Schachter, S., & Singer, J. E. Cognitive, social, and physiological determinants of emotional state. Psychological Review, 1962, 69, 379-399.

It is suggested that emotional states may be considered a function of a state of physiological arousal and of a cognition appropriate to this state of arousal. From this follows these propositions:

1. Given a state of physiological arousal for which an individual has no immediate explanation, he will label this state and describe his feelings in terms of the cognitions available to him. To the extent that cognitive factors are potent determiners of emotional states, it should be anticipated that precisely the same state of physiological arousal could be labeled "joy" or "fury" or "jealousy" or any of a great diversity of emotional labels depending on the cognitive aspects of the situation.

2. Given a state of physiological arousal for which an individual has a completely appropriate explanation, no evaluative needs will arise and the individual is unlikely to label his feelings in terms of the alternative cognitions available.

3. Given the same cognitive circumstances, the individual will react emotionally or describe his feelings as emotions only to the extent that he experiences a state of physiological arousal.

620. Schaefer, T., Jr., Ferguson, J. B., Klein, J. A., & Rawson, E. B. Pupillary responses during mental activities. Psychonomic Science, 1968, 12, 137-138.

With a new electronic technique, pupil size of 40 Ss was measured continuously during a series of intellectual tasks. Time estimation or counting elicited no pupillary changes, but pupil diameter reliably increased (approximately 30%) during number memory, multiplication, and word definition. Dilation was greater for novel or more difficult tasks. If S continued to work a problem after answering, dilation persisted, but silent counting by S terminated task perseveration and dilation. Thinking about pleasant or unpleasant experiences elicited inconsistent dilation, constriction, or no change.

621. Schlosberg, H. Three dimensions of emotion. Psychological Review, 1954, 61, 81-88.

The author contends that the activation theory of emotions is the most adequate to date for conceptualizing the intensive dimensions of emotion, and that electrical skin conductance is a good measure of the extent of activation present. For other dimensions of emotion, however, he feels that other measurement approaches are necessary and discusses facial expressions as one of these. Evidence is presented from facial expression studies which indicates that the whole range of such expressions can be described in terms of a circular surface with pleasantness-unpleasantness and attention-rejection as axes, with level of activation as a possible third dimension. It is concluded that facial expressions and body changes supplement each other in giving us the dimensions along which emotions may vary.

622. Schottstaedt, W. W., Grace, W. J., & Wolff, H. G. Life situation, behavior patterns, and renal excretion of fluid and electrolytes. Journal of the American Medical Association, 1955, 157, 1485-1488.

In the maintenance of a constant environment within the human organism, stores of fluid and salt are of paramount importance. When in response to situations, persons were prepared for short, violent action, as for fight or flight, or during situations evoking tempestuous and aggressive behavior with attitudes and feelings of excitement, intense anger, and apprehension, sodium and water loss occurred. Reactions featured by listless behavior, reduced activity, slowed and decreased speech, with attitudes and feelings of despair, hopelessness, and depression, were associated with retention of fluid and electrolytes. Retention of fluid and electrolytes accompanied responses of fright in terrorizing situations and reactions to severe noxious stimulation and pain. When persons were faced with threatening situations eliciting restless behavior, increased alertness, readiness for action, with mixed feelings of confidence, uneasiness, and tension, renal excretion of water and sodium was decreased and body weight was increased. Situations evoking similar behavior and feelings, yet featured by unusual constraint, were sometimes associated with retention of potassium as well. Diuresis of water and salt with resultant weight loss occurred with ending of such periods of threat.

623. Schottstaedt, W. W., Grace, W. J., & Wolff, H. G. Life situations, behaviour, attitudes, emotions, and renal excretion of fluid and electrolytes - I. Method of study. Journal of Psychosomatic Research, 1956, 1, 75-83.

The purpose of the present investigation was to study variations in renal excretion occurring during the course of daily activities, and to ascertain the feasibility of studying such variations in fluid and electrolyte excretion under circumstances of ordinary daily "routine" rather than under the limiting circumstances of controlled laboratory procedure. Despite obvious difficulties involved in such a procedure, this type of study proved feasible. Wide variations in excretion rates of water, sodium, and potassium were observed in the five healthy subjects studied. The range of variation observed at any time of day was similar in any one of the subjects whether he had been fasting or had had a high level of intake preceding the collection period. In one subject with sodium intake continuously higher than in the others, sodium excretion was also generally higher. However, sudden and transient changes in intake, whether omission of a meal or ingestion of an unusually large meal, had relatively little effect on the excretion rates observed. Many of the variations observed could not be correlated with changes in intake of water, sodium, or potassium, with activity or sleep, or with any combination of these.

624. Schottstaedt, W. W., Grace, W. J., & Wolff, H. G. Life situations, behaviour, attitudes, emotions and renal excretion of fluid and electrolytes - II. Retention of water and sodium: Diuresis of water. Journal of Psychosomatic Research, 1956, 1, 147-159.

The data presented in this paper may be summarized as follows:

(1) In 94 situations which these five subjects perceived as threatening, but which they felt they could meet adequately by alert behaviour and readiness for action, there was a significant decrease in rates of excretion of water and sodium as compared with 119 situations which these same subjects considered neutral and tranquil.

(2) In 30 situations which these subjects felt had elicited sudden feelings of release from tension, or sudden relaxation following sustained effort, there was a significant increase in rate of excretion of water but not of sodium as compared with 119 situations which these subjects considered neutral and tranquil.

625. Schottstaedt, W. W., Grace, W. J., & Wolff, H. G. Life situations, behaviour, attitudes, emotions, and renal excretion of fluid and electrolytes - III. Diuresis of fluid and electrolytes. Journal of Psychosomatic Research, 1956, 1, 203-211.

(1) In thirty situations which evoked a clearly definable reaction pattern characterized by feelings of excitement, uneasiness, or apprehension (pattern B), renal excretion rates of water and sodium were increased as compared with excretion rates observed in the same subjects during neutral and tranquil periods.

(2) In twenty-two situations which evoked a clearly definable reaction pattern characterized by aggressive behaviour or feelings of "anger" (pattern B'), renal excretion rates of water and sodium were also increased as compared with excretion rates observed in the same subjects during neutral and tranquil periods.

(3) Situations evoking mixed reaction patterns combining attitudes and feelings present in patterns A and B' were accompanied by excretion rates of water and sodium which were usually intermediate between the two patterns. Under these circumstances, renal excretion rates of water were comparable to those observed during neutral periods, while renal excretion rates of sodium were elevated above those observed during neutral periods.

When these reaction patterns were reproduced in a laboratory setting under fasting conditions, renal excretion rates showed comparable changes from rates observed during neutral periods under the same circumstances.

626. Schottstaedt, W. W., Grace, W. J., & Wolff, H. G. Life situations, behaviour, attitudes, emotions, and renal excretion of fluid and electrolytes - IV. Situations associated with retention of water, sodium and potassium. Journal of Psychosomatic Research, 1956, 1, 287-291.

1. In the five subjects of these experiments, forty-three situations evoking reactions characterized by reduced physical activity, attitudes of futility or hopelessness, and feelings of depression or exhaustion (pattern C) were associated with decreased rates of excretion of water, sodium, and potassium as compared with excretion rates observed during neutral and tranquil periods.

2. In these subjects, situations arousing complex reactions combining features of two or more of the patterns described were associated with excretion rates which seemed also to combine features observed with each reaction pattern.

627. Schottstaedt, W. W., Grace, W. J., & Wolff, H. G. Life situations, behaviour, attitudes, emotions, and renal excretion of fluid and electrolytes - V. Variations in excretion of endogenous creatinine. Journal of Psychosomatic Research, 1956, 1, 292-298.

In these studies:

(1) Twenty-four-hour creatinine excretion varied from -31 to +39% of the mean in a single individual.

(2) Situations evoking reaction pattern A, characterized by restrained, alert behaviour and feelings of tension and decreased excretion of water and sodium, were accompanied by a significant decrease in the rate of creatinine excretion.

(3) Situations evoking reaction patterns B and B', characterized by restless behaviour, feelings of apprehension, excitement, or anger, and increased excretion of fluid and electrolytes, were associated with a significant increase in creatinine excretion.

(4) Situations evoking reaction pattern C, characterized by reduced activity, feelings of depression or exhaustion and decreased excretion of water, sodium, and potassium, were associated with a significant decrease in creatinine excretion.

(5) Situations evoking reaction pattern A', characterized by relaxation and freedom from previously existent tension accompanied by a water diuresis, were not associated with significant variations in creatinine excretion.

628. Schucker, R. E. An evaluation of methods for measuring consumer reactions to retail packages. (Doctoral dissertation, Purdue University) Ann Arbor, Mich.: University Microfilm, 1959. No. 62-3991.

The primary purpose of the study was the determination of the stability of various kinds of consumer judgments about selected aspects of a sample of rice packages and a sample of candy bar wrappers. Furthermore, an attempt was made to relate the psychological scales to objective measurements of the packages. The package aspects chosen for scaling were: (1) apparent size, (2) attention drawing power, (3) package appeal, and (4) brand name readability.

The rice brands were scaled on all four package characteristics. For samples of college students and housewives, ranging in size from eight to 54, reliable scales were obtained from pair comparison judgments and preferences, an adjective check list, a tachistoscopic procedure, and walkup and angular readability measurements. Less reliable scales were developed based on an eye photography technique.

Candy bar wrappers were scaled on attention drawing power by the method of pair comparisons and, also, from data based on consumers' selections from a free display. The scale developed from actual candy choices showed adequate reliability for one sample of 56 boys, but low reliability for a second sample of 49. Pair comparison judgments obtained from the same 49 consumers were also unstable. The low reliabilities were attributed to certain characteristics of the consumer sample.

629. Schwartz, M. M. Galvanic skin responses accompanying the Picture-Frustration study. Journal of Clinical Psychology, 1957, 13, 382-387.

"The present study compared two variables of the P-F test, namely individual items and scoring categories, with changes in GSR. . . . In general, significant changes in conductance were found to be associated with the stimulus material." . . . greater deflections were found for items 8, 10, and 15. The first two items, but not the third, were frequently selected as the more disturbing pictures. "The higher GSRs for scoring categories M, I, E, I seem to comprise a meaningful pattern involving the turning of blame or anger inwardly." Ss were 20 male undergraduate psychology students.

630. Scott, J. C. Systolic blood-pressure fluctuations with sex, anger, and fear. Journal of Comparative Psychology, 1930, 10, 97-114.

The aim of this study was a determination of the correlation between introspective reports and systolic fluctuations, a determination of any characteristic systolic fluctuations with the specific emotions and, finally, a determination of the range of distribution of these changes over a selected group of 100 male subjects. A connected motion picture narrative provided the sources of stimulation. The source of stimulation for sex was a nude dancing girl, that for anger a violent flogging scene, and that for fear the sight and sound of a cataclysmic destruction of a city. These fitted naturally into the narrative. A Tyco recording sphygmomanometer was the instrument used to record changes in blood pressure. This was not seen by the subject. Each subject was required to fill out a brief questionnaire concerning the strength of his emotions at the crucial points in the film. The conclusions are as follows: "(1) There is no correlation between degree of emotion as reported introspectively and degree of systolic blood-pressure change. (2) The type and degree of blood-pressure fluctuation with the emotions of sex, anger and fear in an individual, have no relation to each other. (3) Sex emotion is characterized by a rise in systolic pressure. (4) Anger and fear have no characteristic vascular reaction. (5) Psychological fluctuations of systolic blood-pressure cannot be measured independently of physiological fluctuations."

631. Scott, S., & Kessler, M. An attempt to relate test anxiety and Palmar Sweat Index. Psychonomic Science, 1969, 15, 90-91.

Forty-seven female Ss completed the Mandler-Sarason Test Anxiety Scale (MSTAS), a rating of apprehension in an experimental situation, and were administered the Palmar Sweat Index (PSI), in the experimental situation. Self-ratings of apprehension and MSTAS were significantly correlated, but neither of these were found to correlate with PSI. Items from MSTAS asking about sweating also were not correlated with PSI. Results were discussed in terms of the criticisms of previous attempts at relating verbal and nonverbal indices of anxiety.

632. Scott, T. R., Wells, W. H., Wood, D. Z., & Morgan, D. I. Pupillary response and sexual interest reexamined. Journal of Clinical Psychology, 1967, 23, 433-438.

Conducted three experiments concerning pupillary response to pictures as a reliable indication of sexual orientation. Using three groups of 20 college students, 60 college students, and five heterosexual and five homosexual prison inmates, the results failed to show significant differences among the groups. There was no evidence that nonpreferred stimuli elicited pupillary constriction. The results indicate that pupillary response is subject to much spontaneous variability "and its use in the diagnosis of individual interest patterns is not justified."

633. Shagass, C. Clinical neurophysiological studies of affect. American Journal of Psychiatry, 1956, 112, 928-930.

This report suggests that the ratio of photic driving at 15 Hz as compared with 10 Hz may be used as an indicant of mood. The data also suggest that the ratio has a tendency to be low in depressed states.

634. Shagass, C. Explorations in the psychophysiology of affect. In J. Scher (Ed.), Theories of the mind. Glencoe, New York: Free Press, 1962. Pp. 122-144.

"If any trend can be discerned in the studies reviewed, it seems to consist of a shift from the periphery to the central nervous system. This shift is methodological rather than a matter of changing interest. The focus of interest has always been on what is going on in the brain, the place "where vital things happen." However, as new methods become available it is becoming more possible to study brain functions directly. It seems to me that we are just now able to glimpse a coming era of really focused psychophysiological investigation, in which neurophysiological and pharmacological tools will be used to provide some definitive information about affect. In such a development I do not visualize discard of the peripheral physiological approaches. I would rather anticipate that these approaches will gain added significance from the studies of central nervous function. And I would further expect that the physiological information will help to sharpen the insight of psychological observation."

635. Shagass, C. The EEG in affective psychosis. In W. P. Wilson (Ed.), Application of electroencephalography in psychiatry. Durham: Duke University Press, 1965. Pp. 146-167.

A minor section of this report discusses personality and attitudinal correlates of EEG patterns.

636. Shagass, C., & Malmo, R. B. Psychodynamic themes and localized muscular tension during psychotherapy. Psychosomatic Medicine, 1954, 16, 295-313.

1. The main purpose was to provide further validating data for the method of continuous electromyographic (E.M.G.) recording during psychiatric interview as an approach to objective interview study. Eleven recorded interviews with three patients were analyzed; nine of these were with one patient who was studied longitudinally.

2. Analysis was guided primarily by the question: Are particular psychodynamic themes associated with specifically localized increases of muscular tension? The results supported an affirmative answer to this question. Increased forearm tension was specifically associated with "hostility" themes in all three cases, while increased leg tension was associated with "sex" themes in the two female patients. These correlations were interpreted from a viewpoint which regards the E.M.G. as an indicator of the effectiveness of central neural mechanisms for resolution of conflict.

637. Shakhar, G. B., Liebllich, I., & Kugelmass, S. The guilty knowledge technique: Application of signal detection measures. Unpublished manuscript, Hebrew University of Jerusalem, undated.

Procedures for the computation of optimal cutoff points suggested by Signal Detection Theory (SDT) were applied to an information detection situation. The use of different payoff matrices relevant to a security screening situation and to a criminal court case produces different cutoff points to be used to classify the GSR responses.

638. Shapiro, A. H., & Fenz, W. D. Control of heart rate in relation to an unconditional stimulus under varying conditions of subjective and objective certainty. Paper presented at the meeting of the Society for Psychophysiological Research, Washington, D. C., October 1968.

The hypothesis that certainty is a relevant cognitive dimension having utility value to self-modulation in the human organism was investigated. This study empirically varied 54 subjects' cognitive certainty through a classical conditioning paradigm involving strong shock. The primary dependent variable of interest was the continuously recorded heart rate response. Three levels of informational input of differential predictive use to the subjects were supplied: (1) temporally random or constant interstimulus (signal to shock) intervals (ISI's); (2) stethoscopically amplified heart sounds of the subject's own heart; (3) a constant beat metronome as an external stimulus.

The main hypotheses were strongly supported and subjects exhibited the influence of cognitive processes as an effective modulator of the heart beat while expecting and upon receiving the acute 1/10 sec stressor over three different series of 10 trials each. Specifically, a beat-by-beat analysis of the heart rate disclosed a highly significant linear accelerative trend to the signal light (light "on" to light "off" -5 sec) which was significantly influenced in the predicted direction by constant or random ISI's and by the subject's own heartbeat or presentation of a metronome.

639. Shapiro, D. Group process under different conditions of success and failure. Annual Report No. 4, October 1964, Harvard University, Boston, Mass., Contract Nonr 1866 43 - NR 170 518.

Papers prepared and published on data collected during the previous year are summarized. An attempt is also made to integrate the results of a number of studies showing the influence of different social and task settings on autonomic response measures. Several new dimensions of comparison appear to be significant: The ability to control or influence the environment, the capacity for initiating activity, and the degree to which the social setting is restricted or free. The data also suggest that the extreme effects of success and failure for the individual in isolation are mitigated in a group setting. Success and failure, moreover, do not have uniform effects in 3-person groups but depend on whether group communication is relatively free or restricted. A second major finding shows that even under restricted conditions of minimal communication and controlled behavioral activity, social roles have different consequences for autonomic response depending on success and failure and on role pairing. Several special problems growing out of the research were investigated: (1) Automatic data processing in psychophysiology; (2) Characteristics of physiological measures; (3) Interrelationship of overt behavior and autonomic response.

640. Shapiro, D., & Crider, A. Psychophysiological approaches in social psychology. In G. Lindzey & E. Aronson (Eds.), The handbook of social psychology. Vol. 3. The individual in a social context. (2nd ed.) Reading, Mass.: Addison-Wesley Publishing Co., 1969. Pp. 1-49.

Among the authors' conclusions, the following are of particular interest in the context of physiological correlates of attitude and attitude change:

Psychophysiology is rapidly moving away from classical conceptions of the nature of peripheral physiological events in behavior, and corresponding adjustments in social-psychological thinking will inevitably follow. It is no longer adequate to view the autonomic nervous system as the seat of emotions or as a simple register of environmental stresses. On the contrary, physiological variables are highly sensitive to seemingly minor differences in the quality and intensity of environmental inputs. This is nicely seen in the autonomic effects attributable to such social-psychological factors as the degree of familiarity among small-group members or the attitudinal dimensions of symbolic material.

This is not to say that physiological processes are not involved in emotional behavior and gross stress reactions, nor to say that they are necessarily more sensitive to social contexts than are other behavioral indices. The important point is that a priori judgments as to the nature of response measures, whether overt or covert, are not a substitute for an experimental analysis of the conditions under which they vary. Thus the opposition of "involuntary" physiological variables to "voluntary" verbal, motor, or perceptual measures is difficult to maintain in light of their similar dependence on such cognitive factors as attitude dissonance, instructional set, and suggestion. On the other hand, where overt and covert behaviors diverge, the latter are an obvious source of added information about individual reactions to experimental manipulations.

641. Shapiro, D., & Leiderman, P. H. Acts and activation: A psychophysiological study of social interaction. In P. H. Leiderman & D. Shapiro (Eds.), Psychobiological approaches to social behavior. Stanford: Stanford University Press, 1964. Pp. 110-126.

"We have shown how certain social roles can be experimentally created by the manipulation of success and failure, and have described the consequences of these manipulations for individual social activity and physiological activation within groups. Three major concepts emerged in the analysis of the relationship between acts and activation in a 3-person group: (1) reinforcement of behavior in a leadership role; (2) coalition formation or role sharing; (3) changes in expectancy dependent upon the ordering of success and failure. The techniques and concepts that emerged were shown to be useful for understanding the relationship between social act and physiological activation."

642. Shapiro, D., & Leiderman, P. H. Arousal correlates of task role and group setting. Journal of Personality and Social Psychology, 1967, 5, 103-107.

Success and failure task roles were studied in different group settings with each individual's overt activity held constant. Significant effects were found for electrodermal level, a measure of behavioral arousal, but not for heart rate. There was greater arousal, as shown by slower rate of physiological habituation, in failure compared to success and in paired compared to single roles. These two variables also had an effect on role perceptions. It was suggested that persistent arousal was more likely in roles characterized by uncertainty or ambiguity.

643. Shapiro, D., Leiderman, P. H., & Morningstar, M. E. Social isolation and social interaction: A behavioral and physiological comparison. Technical Report 5, Harvard Medical School, January 1963.

Eighty-four women performed a simple task under conditions of social isolation and social interaction in a 3-person group. Success and failure in the task were made equivalent in both conditions, and the order of the experience was balanced. Mean level and variability of behavioral initiation, galvanic skin potential, and heart rate were compared. The results are:

1. Both level and variability of initiation were greater for individuals working alone than in groups.

2. Basal level of galvanic skin potential was higher and heart rate tended to be lower under conditions of group interaction. The variability of these measures, as measured by the mean square successive difference, did not differ between the conditions.

3. Levels of initiation and galvanic skin potential were consistent for individuals relative to one another when the group situation preceded the alone situation.

4. Individual differences in heart rate level and galvanic skin potential variability were consistent regardless of temporal order of the isolation and interaction experience.

644. Shapiro, D., & Schwartz, G. E. Psychophysiological contributions to social psychology. Annual Review of Psychology, 1970, 21, 87-112.

It is apparent that psychologists are becoming increasingly aware of the major influence of social psychological variables on overt behavior. The present research indicates that covert physiological behavior is similarly affected, in ways as yet sometimes confusing but often intriguing. We feel that this present state of affairs should be expected, not only because of the relative infancy of social-psychophysiology, but because of the frequent counter-common sense characteristic of psychophysiological data per se. For example, in classical conditioning, while we might expect the heart to accelerate to a conditioned stimulus prior to the onset of electric shock, it decelerates, or while we might expect the heart to accelerate when males attend to arousing stimuli like slides of nude females, it decelerates. It seems safe to predict that social-psychophysiology will uncover new, counter-intuitive phenomena which will bring us closer to more fully understanding social behavior. It is our opinion, in view of the data so far available, that social-psychophysiology is a natural scientific merger, one which at the present stage of theory may be premature, but for which there is now a technology for studying the inherent social-biological nature of man.

645. Shaw, W. A. The distribution of muscular action potentials during imaging. Psychological Record, 1938, 2, 195-210.

There appears to be an increase in muscular action potentials from nearly all of the muscle groups tested during the imaging of the various tasks. There is no good evidence of localization to the muscle groups commonly thought to be involved in such performances. While such action potentials seem to be necessarily concomitant as shown by the report of the unsuccessful subjects and the control groups they are not localized in any particular part of the body nor are they exclusively peculiar to imaging since other workers have shown that action potentials accompany other implicit activities also. The distribution of these action potentials seems to indicate that during the revival of vestigial responses one can expect to be present any muscular activity that accompanied the original response.

646. Shipman, W. G., Heath, H. A., & Oken, D. Response specificity among muscular and autonomic variables. Archives of General Psychiatry, 1970, 23, 369-374.

In the four subgroups of sufficient size that were studied, certain characteristics emerged. Patients with a tense frontalis tended to be older, married, and depressed. Those with a tense gastrocnemius tended to be young, single, hostile, dependent, and active. Those with high heart rates were married, disorganized, and had chronic (trait) anxiety. Those with higher levels of palm sweating were young, were slow moving, used suppression to handle fear, and had little interest in the opposite sex. The relations between trait anxiety and activity level and those between heart rate versus palmar conductance (sweating) seemed most provocative for further research.

647. Shipman, W. C., Oken, D., Goldstein, I. B., Grinker, R. R., Sr., & Heath, H. A. Study in psychophysiology of muscle tension: II. Personality factors. Archives of General Psychiatry, 1964, 11, 330-345.

Fifteen depressed patients underwent extensive psychiatric, medical, and psychological test examinations. Polygraph records of heart rate, blood pressures, movement, and surface action potentials from seven muscles were continually sampled during four successive sessions: a psychiatric stress interview, a session aimed at inducing self-control, a neutral conversation, and solitary rest. During each session affective and defensive aspects of the S's mood were rated. Comparison of the personality traits with values of muscle tension produced the following findings: high overall muscle tension tended to appear in the emotionally stable, least anxious Ss with an active fantasy and a clear sense of personal limits. The hysterically inclined Ss had the lowest muscular and cardiovascular values at rest.

648. Shipman, W. G., Oken, D., & Heath, H. A. Muscle tension and effort at self-control during anxiety. Archives of General Psychiatry, 1970, 23, 359-368.

With the hypothesis that effort at self-control accounts for the role of muscle tension during anxiety, we studied 44 psychiatric outpatients psychophysiology during periods of rest, white noise, and a contrived "danger." The great increases in muscle tension and most autonomic functions during the psychological stress were related to the anxiety ratings and not to the ratings of self-control. Personality variables were related significantly to some of the responses to the white noise. Depressed patients had a major increase in frontalis muscle tension. Field-dependent subjects had a major heart rate increase. The disorganized, impulse-ridden subjects had the greatest increase in palmar skin conductance.

649. Shipton, J., & Walter, W. G. Les relations entre les activites alpha, les modes de pensees et les affinites sociales. (The relationships between alpha activities, modes of thought, and social affinities.) Electroencephalography and Clinical Neurophysiology, 1957, Suppl. 6, 185-202.

When the methods of analysis and display described in the previous paper are used in the course of a psycho-physiological experiment, the personal features of a record are emphasised and it is possible to follow the changes in distribution of the several alpha components which occur either spontaneously or during the performance of diverse tasks.

Information collected in this way permits a classification of normal subjects based on the responsiveness or persistence of the various alpha components. This classification seems to correspond with psychological estimates of mental imagery and of versatility; it can be elaborated by the inclusion of other physiological data such as records of breathing, speech, muscular tension, heart rate, skin resistance and the like.

It has been noticed that a subject in one class tends to associate more readily with someone in the same class than with someone in another class. In this way it is possible to recognize "supplementary pairs" (that is, subjects whose alpha type and way of thinking are similar and who tend to agree in their tactical habits of behaviour, even if they have different strategic aims; such couples are mutually attractive but tend to make the same sort of mistakes) and "complementary pairs" (that is, subjects who differ in their EEG and in their ways of thinking and have different tactics even when in strategic agreement; such couples are not readily attracted to one another but tend to limit or correct one another's mistakes). It is intended to apply this method to the study of more complex situations and larger groups.

650. Shock, N. W., & Coumbs, C. H. Changes in skin resistance and affective tone. American Journal of Psychology, 1937, 49, 611-620.

The present paper reports an experiment on the correlation between quality and degree of affective tone and the psycho-galvanic response. Sixteen odors were presented serially to 40 boys and 40 girls (mean age 12.46 years), who were asked to rate them upon a 5-point scale for P-U. Simultaneously a photographic record was made of apparent electrical resistance in both hand and foot, pulse rate, respiration rate, and gross bodily movement. The reliability of the ratings for the whole group was .960. The reliability of the galvanometric records was .920 for the average of the hand and foot. "Taking into account the order of presentation, the stimuli were divided into three groups on the basis of the mean ratings, SP, SU, and VU. The SP and SU groups were of equal affective strength but of opposite affective quality. It is tentatively concluded that, in individual cases, (1) the affective quality of the stimulus must be considered, as well as the affective strength, as a factor determining the magnitude of the change in skin resistance; and (2) for equal degrees of affective strength unpleasant stimuli tend to give greater skin-resistance changes than pleasant stimuli."

651. Shortell, J., Epstein, S., & Taylor, S. P. Instigation to aggression as a function of degree of defeat and the capacity for massive retaliation. Journal of Personality, in press.

Forty-eight Ss, half of whom were assigned to a condition of massive retaliation (MR) and half of whom were not (NMR), competed against a presumed opponent. The loser on each trial received a shock of intensity level selected by the winner at the beginning of a trial, and, simultaneously, feedback on the opponent's shock setting. The winner received only feedback on the opponent's shock setting. Defeat and feedback of aggressive intent (opponent's shock setting) were varied independently. In the MR condition, an extreme level of shock could be selected. Although its use was avoided, its psychological presence influenced perception of the opponent, aggressive behavior, and physiological arousal. Consistent with previous findings, primary frustration was found to be a relatively inconsequential instigator to aggression compared to learned social attitudes.

652. Sigler, L. H. Emotion and atherosclerotic heart disease. British Journal of Medical Psychology, 1967, 40, 55-64.

We have observed changes in the electrocardiogram not only during direct emotional strain but also during the recall of past emotional disturbances in susceptible individuals. The changes may be those of myocardial ischaemia, ventricular ectopic beats, and alterations in ventricular depolarization and/or repolarization. The mechanism appears to be an awakening of past dormant, subconscious impressions, causing sympathetic nerve stimulation which disturb the normal electro-physiology of the heart. The disturbances are either due to mere sympathetic acceleration of the heart, bringing out inherent defects in the heart muscle and conduction system, or to direct affect on localized areas of the heart or to endocrine changes affecting the heart, or to a combination of these.

653. Silverman, A. J., Cohen, S. I., & Shmavonian, B. M. Investigation of psychophysiologic relationships with skin resistance measures. Journal of Psychosomatic Research, 1959, 4, 65-87.

Using a newly designed, highly sensitive and stable GSR meter, basal resistance was found to be inversely related to arousal. Surgery with a dog showed an intact sympathetic nervous system is important, but blood volume shifts are not, in causing resistance drops. Moderate arousal (GSF1) yielded the best tracking performance under hypotensive stress (human centrifuge). Heightened arousal had the greatest responsiveness to threshold electrical stimulation. Affectively charged words evoked arousal to the degree they had been psychiatrically judged most personally meaningful. GSR measures of arousal agreed with measured venous tone (12 Ss), blood pressure changes (15 Ss), and rises of adrenaline and noradrenaline in 15 Ss under verbal chastisement.

654. Silverman, A. J., Cohen, S. I., & Zuidema, G. D. Psychophysiological investigations in cardiovascular stress. American Journal of Psychiatry, 1957, 113, 691-693.

The fact that psychological or emotional changes may cause physiological disturbances has been demonstrated for many years. From these demonstrations have come multiple attempts to predict physiologic alterations from psychological test data, as well as attempts to find the psychological common denominators in a given syndrome. These attempts frequently show low correlations because, among other reasons, "broad band" personality assessments often are not sensitive enough in a specific psychophysiological area, and tend to "bury" the desired information.

In this preliminary report of a study under way at the Aero Medical Laboratory, an attempt is made to demonstrate that with proper attention to data obtained from other disciplines, and with appropriately focused psychophysiological techniques, precise relationships may be established between the physiologic and psychiatric aspects of the individual. The approach utilized illustrates some of the psychosomatic aspects of the cardiovascular system.

655. Simms, T. M. Pupillary response of male and female subjects to pupillary differences in male and female picture stimuli. Perception and Psychophysics, 1967, 2, 553-555.

On exposure to a series of identical pictures of a young man and a young woman differing only in size of the pupils of the eyes, the eyes of married Ss dilated more to the opposite sex pictures than to the like sex pictures, dilated most to the opposite sex picture with the larger pupils, and dilated least to the like sex picture with the larger pupils. Difficulties with neutral stimuli were noted and an improved method of assessing picture stimuli brightness is described.

656. Simonov, P. V. Studies of emotional behavior of humans and animals by Soviet physiologists. Annals of the New York Academy of Science, 1969, 159, 1112-1121.

This article discusses briefly physiological responses in a hypothesis formation task with feedback as to correctness of the hypothesis. Also briefly discussed is the effect of astronaut expectations on heart rate.

657. Simonov, P. V., Ivanov, I. S., & Valueva, M. N. Eksperimental'noe issledovanie položitel'nykh emotsional'nykh reaktsii cheloveka. (Experimental investigation of positive emotional reactions in man.) Zhurnal Vysshei Nervnoi Deyatel'nosti, 1968, 18, 932-939.

Forty 20-40 year-old Ss were used in three experimental approaches: (a) determination of the "emotional evaluations" (6 Ss) of temperature effects (palmar heating and cooling, 6-50° C), (b) the positive emotional reactions (17 Ss) arising during the differentiation of complex visual signals (predicting which of a sequence of five digits exposed for 10 seconds, would be reinforced by a whistle), and (c) the mental reproduction (17 Ss as actors) of "life situations" having a pronounced positive tone. EEGs, EKGs, and GSRs were recorded. Study of the emotional reactions evoked by temperature changes shows that positive evaluation, classed as pleasant, had a fundamental relative character. They were determined by the discordance between the traces of preceding action and the present stimulus. This substantially distinguished positive emotional reactions from the negative ones arising in the zone of low and high temperatures, which were persistently unpleasant regardless of the preceding situation. The effect of discordance played an important role also in the genesis of more complex positive reactions such as those arising in the solution of a task connected with the differentiation of visual signals. To the degree that the "content of the nervous trace (hypothesis, model, etc.) coincides with the actual stimulus," it is possible to speak only of the growth of probability of attaining the goal (solution of the task), in the face of the predictions made by the Ss. In comparison with negative emotional reactions, positive ones are connected with the activity of a complicated nervous mechanism and, evidently, reflect a much later evolutionary acquisition.

658. Simonov, P. V., Valueva, M. N., & Ershov, P. M. O nekotorykh osobennostiakh proizvod'nykh i neproizvol'nykh reaktsii cheloveka. (Voluntary and involuntary emotional reactions in man.) Zhurnal Vysshei Nervnoi Deyatel'nosti, 1964, 14, 204-210.

Using 21 healthy Ss (all students of dramatics) a study was made of the changes in the heart rate, GSR, and EEG when Ss anticipated a painful stimulation, and when Ss tried to reproduce mentally the frightening situation. It was found that the voluntary evoked emotion is accompanied by greater organic changes than fear produced by real threat.

659. Simpson, H. M. Effects of a task-relevant response on pupil size. Psychophysiology, 1969, 6, 115-121.

This experiment examined the effects on pupil size of the relevance of an overt response to a cognitive task. Sixteen Ss were assigned to two experimental groups. In one group Ss were required to judge the pitch equality of tones and, subsequently, indicate their decision by pressing or not pressing a telegraph key. In the other groups Ss were required to make the pitch-discriminations, but the key press response was unrelated to the preceding cognitive task. Continuous photographs of each S's pupil were taken during the experiment. Results showed that a small amount of pupillary dilation occurred during the discrimination task in the group where the key press was irrelevant to the pitch discrimination. In the group where S's behavior indicated task fulfillment, however, a significantly greater increase in pupil size occurred, the amount of dilation being larger when task completion was indicated by the key press response than when fulfillment was indicated by no key press. The findings were discussed in terms of arousal associated with apprehension about evaluation, and muscle tension from anticipation of making the overt response.

660. Simpson, H. M., & Hale, S. M. Pupillary changes during a decision-making task. Perceptual and Motor Skills, 1969, 29, 495-498.

The effects on pupil size of a simple decision-making task were examined. Subjects were assigned to either an experimental group ($n = 7$) or a yoked control group ($n = 7$). Subjects in the experimental group were given a two-choice decision task and on each trial S was presented two alternative directions in which a lever could be moved. Subject had to decide the direction to move the lever and, subsequently, make the response. Subjects in the control group received essentially the same task conditions except no decision was required, since S was told which direction to move the lever. Results showed significantly greater pupillary dilation during the decision period in the experimental group than in the control group and these findings were discussed in terms of cognitive load.

661. Simpson, H. M., & Paivio, A. Changes in pupil size during an imagery task without motor response involvement. Psychonomic Science, 1966, 5, 405-406.

A previous study showed that pupillary dilation is associated with attempts to generate mental images to stimulus words, image arousal being indicated by a key press. The present study revealed similar but attenuated dilation effects when the key press response was eliminated. The difference can be interpreted in terms of motivational effects of task difficulty, or arousal effects associated directly with the motor response. Word pleasantness was also a variable.

662. Sines, J. O. Conflict-related stimuli as elicitors of selected physiological responses. Journal of Projective Techniques and Personality Assessment, 1957, 21, 194-198.

The present report concerns the identification of visual stimuli which reliably and selectively evoke physiological activity (respiration rate, GSR, heart rate) in persons considered to be primarily conflicted concerning passive-dependent needs, hostility, or sexuality. On the basis of the data presented it has been concluded that: (1) The stimuli described evoke changes in physiological activity which agree, at a statistically significant level, with the clinical formulation concerning the conflict area; and (2) While the relationships found are not of sufficient magnitude to allow interpretation with individual subjects, their level of significance suggests their usefulness in research with groups of subjects.

663. Singer, J. L., & Antrobus, J. S. Eye movements during fantasies: Imagining and suppressing fantasies. Archives of General Psychiatry, 1965, 12, 71-76.

Eye movements of 48 Ss were measured by continuous electro-oculograms (EOGs). EOGs were more frequent under suppress conditions and the difference was unaffected by exposing S to his visual surroundings. The results favor a rate of cognitive change model over a visual "looking" model. An arousal model was not supported because heart rate was not significantly different under imagine and suppress condition. Neither EOGs nor heart rate varied when comparisons were made between emotionally positive, negative, and neutral fantasied objects.

664. Skaggs, E. B. Changes in pulse, breathing and steadiness under conditions of startledness and excited expectancy. Journal of Comparative Psychology, 1926, 6, 303-317.

A study of the foregoing results indicates that, as far as the pulse and breathing changes go, there are no differences between the state of startledness, such as we produced, and a prolonged state of excited expectancy. The inspiratory movement in breathing caused by sudden diaphragmatic contraction and a sudden change from normal mark physiological distinctions which appear to be significant. The startled condition disappears very quickly and appears to have no effect on steadiness (voluntary muscular control) whereas the prolonged period of excitation has a marked effect on steadiness. A condition of tenseness (consciousness of general muscular contractions?) is characteristic of excited expectancy, along with a consciousness of heart beat. This tension is not present in the condition of startledness. When we have made all the distinctions possible there still seems to be a similar or common element in the two conditions. That is to say, while one may single out important differences in physiological (and conscious) accompaniments, both conditions remain qualitatively emotional and, we are tempted to say, identical in core.

665. Small, J. G., Stevens, J. R., & Milstein, V. Electro-clinical correlates of emotional activation of the electroencephalogram. Journal of Nervous and Mental Disease, 1964, 138, 146-155.

Neurologic, electroencephalographic, psychiatric, and psychological examination was applied to 44 patients with focal or generalized convulsive disorder. Subjects were then exposed to a stressful experience (review of unpleasant past experiences) with concurrent recording of EEG and autonomic variables. Of the 37 patients who gave emotional responses, 12 showed activation of the EEG during psychological stress.

666. Smith, A. A. An electromyographic study of tension in interrupted and completed tasks. Journal of Experimental Psychology, 1953, 46, 32-36.

Fifteen Ss were given four mirror-tracing tasks in an effort to determine differences in muscle tension between complete and incomplete activities. Continuous EMG records were obtained from five muscle groups. "Activity produced a steady rise in tension; this was related to distance from the goal. Muscular tension in certain critical areas persisted for a time after interruption." Interpretations of the results are offered.

667. Smith, A. A., Malmö, R. B., & Shagass, C. An electromyographic study of listening and talking. Canadian Journal of Psychology, 1954, 8, 219-227.

Twenty-two psychiatric patients and 11 normal controls listened to a faulty sound recording. They were later asked to tell what they remembered of the record, and to report their feelings. EMGs from five muscle groups were recorded. Results were: (1) During listening, rising and falling gradients of tension were observed in speech muscles, and in extensor muscles of both arms, (2) All muscles recorded from showed significant increases in tension with talking, (3) Differences between patients and controls were seen only in speech muscles, and then chiefly during questioning about feelings.

668. Smith, C. E. A study of the autonomic excitation resulting from the interaction of individual opinion and group opinion. Journal of Abnormal and Social Psychology, 1936, 31, 138-164.

In this experiment the behavior of subjects was observed simultaneously on two levels, the verbal and the sympathetic. A situation was created wherein a subject had to agree or to disagree verbally with statements presented, having been informed previously of the majority opinion of the group of which he was a member. By combination of responses and by changes from an original opinion, the possibility of conflict was present. Responses of "no" were accompanied by greater galvanic skin response than were responses of "yes." Responses against the group opinion were accompanied by greater g.s.r. than were responses "with" the group opinion. The magnitude of the response varies proportionally with the degree of conviction asserted, excluding indifference and absolute conviction. Three processes contributing to the thalamic excitation were postulated: (1) the process arising from the intensity of the degree of conviction, (2) the decisional process, (3) the assertional process. The decisional process was related to internal factors, and the assertional process to external factors, each contributing to conflict and anxiety. The degree to which each process contributes to the magnitude of the galvanic skin response was evaluated.

669. Smith, D. B. D., & Wenger, M. A. Changes in autonomic balance during phasic anxiety. Psychophysiology, 1965, 1, 267-271.

Measurements of autonomic nervous system function were made for eleven graduate students of psychology on two occasions: (a) in the hours shortly before they were to take the preliminary oral examination for the Ph.D. degree; and (b) at the same time of day approximately one month later or earlier. Scores of autonomic balance were derived from standardized weighted data in order to test the hypothesis that such scores would significantly decrease during the phasic anxiety experienced by students just before oral examinations. The hypothesis was supported. All students showed markedly lower values in the pre-examination tests. The results thus indicate an apparent dominance of sympathetic nervous system activity in such phasic anxiety states. Moreover, significant differences in the predicted direction were obtained for six of eight variables. On the day of the oral examination subjects had less salivary output, higher sublingual temperature, shorter heart period, greater systolic and diastolic arterial pressures, and less change in log palmar skin conductance.

670. Smith, R. S. An investigation of the relationship between physiological and cognitive measures of the affective response to color. (Doctoral dissertation, University of Pennsylvania) Ann Arbor, Mich.: University Microfilms, 1958. No. 58-3373.

Judgments of excitatory value, judgments of affective value, and galvanic skin responses were obtained in response to a series of ten hues selected from the Munsell Book of Color. Three separate presentations of the color stimuli were made. The galvanic skin response was recorded on the first presentation before the establishment of a definitive cognitive set. The entire procedure was replicated on the same subjects after a minimum interval of three weeks. Twenty female students enrolled in a nursing training program at a large metropolitan hospital served as subjects.

A significant relationship was demonstrated between the galvanic skin response and judgments of excitatory value, and between the galvanic skin response and distance of the stimuli from the indifference point of the pleasant-unpleasant continuum. In addition, hues rated high in excitatory value were observed to produce larger galvanic skin responses than hues rated low in this respect. The hypotheses dealing with the relative strength of pleasant and unpleasant stimuli of equivalent distance from the indifference point, and the red-green difference, were not confirmed by the data. The significance of these findings for the activation theory of emotion was discussed.

671. Smith, R. W. Discriminative heart rate conditioning with sustained inspiration as respiratory control. Journal of Comparative and Physiological Psychology, 1966, 61, 221-226.

In a classical discrimination paradigm with instructions to expect shock at certain temporal loci used to obtain anticipatory heart rate CRs, Ss expected shock on a specific flash in five red sequences (CS + trials), but not in five white sequences (CS-). Two groups were compared with their preconditioning controls with the same respiration. The Normal Respiration group showed acceleration-deceleration on CS+, but no reliable form on CS-. The Sustained Inspiration group showed strong acceleration on CS+ and weak acceleration on CS-. Respiratory mediation of deceleration, often observed in HR conditioning, is strongly suggested. Stimulus substitution theory is lent support, given accelerative CR and UR.

672. Snoek, J. D., & Dobbs, M. F. Galvanic skin responses to agreement and disagreement in relation to dogmatism. Psychological Reports, 1967, 20, 195-198.

Forty-eight female college students, selected to be relatively high or low on Rokeach's Dogmatism scale, listened to a series of tape-recorded statements asserting opinions that were either in strong agreement, strong disagreement, or mild disagreement with attitudes common in their group. Changes in galvanic skin responses were measured for each of 12 statements, four items representing each agreement condition. GSRs were greater for strong disagreement than strong agreement and for strong agreement than mild disagreement. Analysis of variance of the transformed GSR scores showed significant effects of level of dogmatism and extent of disagreement.

673. Solyom, L., & Beck, P. R. GSR assessment of aberrant sexual behavior. International Journal of Neuropsychiatry, 1967, 3, 52-59.

A preliminary study is presented in which four patients with sexually aberrant behavior were shown photographs of their sexually stimulating object while their GSRs were measured. The responses were compared with those elicited by neutral and heterosexual stimuli. Analysis of the results indicates that responses to the particular sexual stimuli are stronger and more prolonged. The significance of this method for diagnosis and treatment is discussed.

674. Speisman, J. C. Autonomic monitoring of ego defense process. In N. S. Greenfield & W. C. Lewis (Eds.), Psychoanalysis and current biological thought. Madison: University of Wisconsin Press, 1965. Pp. 227-243.

The findings may be categorized as follows:

1. The simple fact of physiological indications of arousal under conditions where the primary stimulus is essentially a psychological one (that is, a film) and where no physical involvement of the subject occurs.

2. The demonstration that the response to the film is not a random one or a general response to shock but rather is directly tied to the contents of the film itself.

3. The manipulation by verbal means of the reactions of the autonomic nervous system as assessed by skin resistance. This finding may be elaborated somewhat: (a) The fact that three of the four sound tracks caused a definite reduction in autonomic response compared with the silent condition. This provides a comparison of the reactions of individuals, when left to their own devices, to the stimulus and to conditions where a defensive orientation is provided. (b) The comparison between the defensive sound tracks of denial and intellectualization and the nondefensive or trauma tracks. These comparisons indicate that it is not simply the addition of sound to the stimulus value of the film that provides for a reduction in response but rather the content of the verbal material which is important. The trauma track indicates a further kind of manipulation of the response by verbal means, since the trauma track increases the response above that of the silent version.

675. Speisman, J. C., Lazarus, R. S., Davison, L., & Mordkoff, A. M. Experimental analysis of a film used as a threatening stimulus. Journal of Consulting Psychology, 1964, 28, 23-33.

In an effort to identify sources of stress reaction, a threatening film depicting a primitive genital operation was analyzed experimentally by dividing it into three sections of different contents. Impact of the sections was compared on physiological and psychological measures of stress reaction. The threat value of the film depended not only on the genital operation scenes, interpreted by previous investigators as producing castration anxiety, but also upon other types of contents, such as nudity. Moreover, in addition to differing in degree of disturbance produced, the film sections resulted in variation in the pattern of affects. Such patterns cannot be studied at the physiological level of analysis. Personality factors also determined reactions to the film threats.

676. Speisman, J. C., Lazarus, R. S., Mordkoff, A., & Davison, L. Experimental reduction of stress based on ego-defense theory. Journal of Abnormal and Social Psychology, 1964, 68, 367-380.

Previous research had shown that a silent film showing primitive adolescent "subincision" rites produced marked stress reactions. Three sound tracks were created for the film and compared in impact with the silent version. One, called the trauma track, pointed up the threatening aspect of the film. The other two, based upon the theory of ego defense, were designed to encourage defensive interpretations of the film's contents so as to reduce threat. One consisted of denial and reaction formation statements about the film, the other was based on intellectualization. The trauma track increased evidences of stress response especially with respect to continuous recordings of skin conductance during the film. The defensive sound tracks reduced skin conductance evidence of stress response. The effectiveness of the defensive sound tracks interacted with the two S groups. Intellectualization was effective for the students and may have been also for the air executives, but denial was not as effective, at least for the student group. The findings supported the importance of the process of cognitive appraisal of threat in producing stress reactions, permitting the conclusion that the same visual stimulus varies in the amount of stress produced depending upon the nature of the cognitive appraisal the person makes regarding its significance for him.

677. Speisman, J. C., Osborn, J., & Lazarus, R. S. Cluster analysis of skin resistance and heart rate at rest and under stress. Psychosomatic Medicine, 1961, 23, 323-343.

Thirty-five male and 35 female undergraduates went through a personality assessment session, a control session (neutral film) and an experimental session (stressor film on primitive subincision rites). During the control and experimental sessions continuous recordings of heart rate and skin resistance were taken. It was found that certain autonomic measures are independent of each other, although under stress, some will covary. Certain autonomic measures (response and recovery) were found to be unsatisfactory while others (level and variability) were always useful. Responses in the two autonomic systems did not correlate. The stress film was very effective.

678. Staats, A. W., Staats, C. K., & Crawford, H. L. First order conditioning of meaning and the parallel conditioning of a GSR. Journal of General Psychology, 1962, 67, 159-167.

A GSR was conditioned to the word LARGE, as it was presented in a list of words to the Ss, using shock and noise as UCS. The word BIG was also presented at the end of the list to test for generalization of the conditioned GSR. Generalization did not occur. Subsequent to this conditioning procedure, the evaluative meaning of LARGE, and its synonym BIG were measured using an appropriate semantic differential scale. Negative evaluative meaning had been conditioned to LARGE. This meaning did not generalize to BIG. Thus, the same procedure which conditioned a GSR to a word also conditioned negative evaluative meaning to the word -- but in neither case did the conditioned response generalize to a synonym word. It was found, in addition, that the intensity of the conditioned GSR was significantly correlated with the intensity of the conditioned meaning response. The results support the theory that word meaning consists of responses which are classically conditioned to a word through systematically pairing it with certain aspects of the environment.

679. Stancak, A. Diferenciacia emocii pomocou elektrokapacitnej pletyzmografie. (Differentiation of emotions by electrocapacity plethysmography.) Ceskoslovenska Psychiatrie, 1967, 63, 20-26.

Twenty-one healthy persons (average age 34 years) and 20 patients with endogenous depressive syndrome (average age 41 years) were examined. By means of electrocapacity plethysmography reactions to a positive impulse (a comic film) and a negative impulse (films Child of Fear and Hazards) were estimated. A control investigation was carried out under rest and after the application of 1 cc of Adrenaline Spofa. The sample of patients showed statistically significant elevation of systolic blood pressure, enhanced frequency of respiration, reduced plane of the plethysmographic curve, and multiplication of alpha waves. Both samples reacted to all kinds of impulses by increased frequency of breathing and a reduction of average volume changes. Reaction to positive impulses was similar in both groups, but in the patients it was more intensive. The reaction to negative impulses was greater in the normal sample.

680. Starch, D. Mental processes and concomitant galvanometric changes. Psychological Review, 1910, 17, 19-36.

1. During undisturbed passivity practically no galvanometric changes occurred.
2. All the different types of mental processes produced by the various stimuli were accompanied, without exception, by galvanometric changes.
3. Some mental processes were characterized by very much larger deflections than others. Emotional processes and muscular activity produced the widest deflections, while habitual mental activity and the process of visual attention produced the least deflections.
4. The degree of intensity of emotional experiences corresponds very closely with the amount of deflection. The average deflection of all emotions rated as 'weak' is .23 cm., of all rated as 'medium' .63, and of all rated as 'strong' .66.

681. Stennett, R. G. The relationship of performance level to level of arousal. Journal of Experimental Psychology, 1957, 54, 54-61.

A test of the hypothesis that an inverted-U relationship exists between the level of arousal and performance level was made by comparing the performance of 31 Ss on an auditory tracking task under different conditions of incentive. These conditions ranged widely from one in which S was under the impression that his scores were not even being recorded to one in which his score determined whether or not he avoided a 100-150-v. shock and earned bonus money of from \$2.00 to \$5.00. When the effects of learning on performance scores were controlled and an interaction effect of the order of presentation of the experimental conditions had been partialled out, the data of this study gave strong support to the hypothesis. The hypothesis held regardless of whether palmar conductance level or the EMG response of any one of four different muscle groups was used as the criterion of arousal.

682. Stern, J. A., Graham, D. T., & Winokur, G. Some research toward a theory of emotional specificity. American Psychologist, 1957, 12, 426. (Abstract)

Utilizing the clinical observations published by Grace and Graham, the present study attempts to experimentally investigate the relationship between specific attitudes (emotions) and physiological changes within the organism.

683. Stern, J. A., Winokur, G., Graham, D. T., & Graham, F. K. Alterations in physiological measures during experimentally induced attitudes. Journal of Psychosomatic Research, 1961, 5, 73-82.

Results of the study were:

(1) With the hypertension attitude, there was a rise in diastolic blood pressure which was greater than the rise with the Raynaud's attitude and significantly greater than the rise with the hives attitude.

(2) During the first four minutes of the attitude period, there was a drop in skin temperature with all attitudes. This initial "startle" effect was also observed in a previous experiment.

(3) During the last six minutes of the attitude period, the skin temperature rose with the hives attitude and remained stable with the Raynaud's attitude. When significant differences in the slopes of the temperature curves during the control period were equated, changes in slope during the attitude period differed in accord with expectation. Results with the hives and Raynaud's attitudes were significantly different and replicated findings of a previous experiment. The change under the hypertension attitude fell between the hives and Raynaud's attitude slopes and was significantly different from the hives but not from the Raynaud's results.

684. Stern, R. M., & Botto, R. W. Behavioral and physiological effects of false heart rate feedback: A replication and extension. Unpublished manuscript, The Pennsylvania State University, 1968.

Two experiments were conducted to study the behavior and physiological effects of false heart rate feedback. These experiments were based on a paradigm advanced by Valins who stressed that the mere belief that one's heart beat is changing, regardless of actual physiological changes, is sufficient to affect behavior. The two experiments involved (1) a replication of Valins' original study with a closer examination of actual physiological responses, and (2) an examination of the role which subject attention plays. It was concluded that what Valins ascribed to merely the belief that physiological actions were occurring may have, in fact, been due to actual physiological changes precipitated by a general attention factor.

685. Stern, R. M., Botto, R. W., & Herrick, C. D. Effects of false heart rate feedback on behavioral and true heart rate responses to unpleasant stimuli. Unpublished manuscript, The Pennsylvania State University, undated.

Thirty female and 30 male Ss were shown slides of accident scenes while hearing auditory feedback which either increased, decreased, or remained constant for each slide. Subjects who were told that they were hearing their own heart beat, rated as more unpleasant those slides to which their "heart beats" increased than those to which their "heart rate" remained constant. Ratings of Ss who were told that they were hearing extraneous sounds were not differentially affected by changes in the sounds. Subjects who were instructed to pay particular attention to the sounds showed behavioral results similar to the "heart rate" subjects as well as similar patterns of actual heart rate response. These results are discussed in light of previous findings obtained with sexually oriented stimuli.

686. Stern, R. M., & Lewis, N. L. Ability of actors to control their GSRs and express emotions. Psychophysiology, 1968, 4, 294-299.

Ability to control GSRs through the use of ideational stimulation was studied in 26 professional actors. During one 10-minute period, "Respond," Ss had to make as many GSRs as possible; during the other period, "Rest," Ss were instructed to inhibit their GSRs. All Ss received continuous visual feedback of their responses during both periods. No relationship was found between ability to control GSRs and emotional expression as measured by the ratings of directors. However, as predicted, method actors performed at a significantly higher level than non-method actors. An additional finding was that those actors who normally experience sweating as their primary response to stress performed at a higher level than non-sweaters.

687. Sternbach, R. A. Assessing differential autonomic patterns in emotions. Journal of Psychosomatic Research, 1962, 6, 87-91.

In order to discover the autonomic pattern for sadness, 10 children, age 8, were shown the motion picture Bambi while continuous recordings were made of the palmar skin conductance, gastric motility, respiration rate, heart rate, eyeblink rate, and finger pulse volume. At the point they all reported was the saddest, skin resistance and lacrimation increased, suggesting an inhibition of sympathetic nervous system activity. At the happiest point for each of them, there was a significant decrease in gastric peristaltic rate, suggesting a possible decrease in vagal activity.

688. Sternbach, R. A. The effects of instructional sets on autonomic responsivity. Psychophysiology, 1964, 1, 67-72.

The purpose was to determine whether instructional sets would influence the pattern of autonomic response.

In the first study sound and pain were compared in three groups instructed as to expected effects of the sound (a) "neutral," (b) analgesic, (c) hyperalgesic. Palmar sweating, heart rate, and finger pulse were recorded. In the second study one group was tested three times with instructions as to expected effects on stomach of three "drugs," (a) "relaxant," (b) "placebo," (c) "stimulant." All three drugs were the same capsule containing the magnet for recording stomach motility.

It was found that the instruction produced the expected autonomic response pattern in the majority of subjects.

689. Sternbach, R. A., Gustafson, L. A., & Colier, R. L. Don't trust the lie detector. Harvard Business Review, 1963, 40, 127-134.

Discusses how it operates, operator's claims, problems of validity, problems of reliability, costs, and the question of morality.

690. Sternbach, R. A., & Tursky, B. Ethnic differences among housewives in psychophysical and skin potential responses to electric shock. Psychophysiology, 1965, 1, 241-246.

From earlier work on the effects of instructional sets, it was hypothesized that subcultural differences in attitudes toward pain should be reflected in psychophysiological correlates. Yankee, Irish, Jewish, and Italian housewives participated in threshold and magnitude estimation studies of electric shock, and their skin potential responses to repetitive electrical stimulation were recorded. Significant differences in upper thresholds and in the adaptation of diphasic palmar skin potentials are consonant with attitudinal differences, and such differences support earlier findings on the influence of sets on psychophysiological functioning.

691. Stevenson, I. Physical symptoms during pleasurable emotional states. Psychosomatic Medicine, 1950, 12, 98-102.

Thirteen cases are cited in which somatic changes, urination, vomiting, diarrhea, palpitations, etc., occurred during joy or elation as well as when anxious, resentful or depressed.

692. Stevenson, I. Variations in the secretions of bronchial mucus during periods of life stress. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 596-601.

In a patient with bronchiectasis the secretion of bronchial mucus was found to increase during periods of life stress, sometimes to as much as six to eight times the usual amount. In a patient with bronchial asthma, during an interview, increased bronchial secretion was observed to be associated with feelings of anxiety and resentment evoked by discussions of stressful life situations. It is concluded that marked changes in the secretion of bronchial mucus may occur during emotional disturbances and that such changes may be important in the origin and course of certain diseases of the respiratory system.

693. Stevenson, I., & Duncan, C. H. Alterations in cardiac function and circulatory efficiency during periods of life stress as shown by changes in the rate, rhythm, electrocardiographic pattern and output of the heart in those with cardiovascular disease. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 799-817.

1. In 70 subjects with a variety of cardiovascular complaints life stress evoking anxiety and resentment was met by cardiovascular mobilization. This was characterized by increase in the heart rate and cardiac output and elevation of the blood pressure.

2. In the few instances where the stress evoked dejection and despair the cardiovascular response was a hypodynamic one, with decrease in the heart rate and cardiac output and usually a lowering of the blood pressure.

3. Rapid alterations in the electrocardiogram, including changes in the amplitude and direction of the T-wave, occurred in association with changes in the feeling state.

4. Disturbances in the cardiac rhythm (extrasystoles, paroxysmal tachycardia and paroxysmal auricular fibrillation) occurred in relation to anxiety, resentment and depression evoked by life stress.

694. Stevenson, I., & Ripley, H. S. Variations in respiration and in respiratory symptoms during changes in emotion. Psychosomatic Medicine, 1952, 14, 476-490.

1. In a pneumographic study of 22 patients (15 with asthma and seven with anxiety states) respiratory patterns were found to vary closely with the emotional state.

2. Increased rate or depth or both and sighing were found chiefly with anxiety but sometimes during anger and resentment. Decreased rate or depth or both were found when the patients felt tense and on guard with feelings of anxiety or anger and when feeling sad or dejected.

3. Irregularity of respiration was commonly associated with anger, particularly when this was suppressed. It was also associated with feelings of guilt and occurred during weeping.

4. A prolongation of expiration during periods of emotional disturbance was found in a higher proportion of patients with asthma than of those with anxiety. In three asthmatic patients this change was associated with wheezing and dyspnea and in one with dyspnea alone.

5. Discussions of attitudes and conflicts known to be associated with respiratory symptoms (dyspnea and chest discomfort) evoked such symptoms in more than half (13) of the patients, and the symptoms were related to changes in the respiratory pattern.

6. It is concluded that respiratory symptoms associated with emotional disturbances may arise from altered respiratory function in response to symbolic stimuli to action and often are related to conflict concerning such action.

695. Steward, J. R. The effect on heart rate of warnings and receipt of pleasant and aversive auditory stimuli. (Doctoral dissertation, University of Connecticut) Ann Arbor, Mich.: University Microfilms, 1962. No. 62-4397.

A basal heart rate was established by recording the subjects' heart rates as they watched five exposures of the numbers 1 through 12 rotate in a memory drum. After this each subject was assigned to one of six experimental groups. Two groups were threatened with an annoying sound to occur at number 10 and two groups were threatened with a very punishing sound to occur at 10. One of each pair of groups actually did hear the sound promised, on the first presentation of the number 10. The other two groups received no sound. All of these subjects then received five more trials. These four groups were planned to parallel mild shock groups used by Deane and strong shock groups used by Nolan.

The last of the five sound groups was told to expect a pleasant sound at 10, but no sound was given.

All sound groups gave similar results in that whether a subject is warned of a punishing sound, an annoying sound or a pleasant sound, on the first eight stimulus numbers of the first trial after warning of a sound to come, the heart rate shows a significant deceleration. On the following trials whether or not the subject actually receives a sound the heart rate returns to the basal level.

696. Stewart, M. A., Stern, J. A., Winokur, G., & Fredman, S. An analysis of GSR conditioning. Psychological Review, 1961, 68, 60-67.

In summary, we have put forward reasons for thinking that so far work on GSR conditioning has dealt with the adaptation and recovery of unconditioned responses rather than conditioning of responses. We have described criteria for defining true conditioned GSR in terms of the response latency, following methods used by previous investigators working with eyeblink and startle conditioning. The use of these criteria is illustrated in an experiment in which we tried to condition GSR in a group of 19 normal Ss. Responses were obtained which could be distinguished from unconditioned responses and which had some of the characteristics of true conditioned responses.

697. Stokvis, B., Liem, S. T., & Bolten, M. P. Physiopsychologische Untersuchungen über den Szondi-Test. (Physiopsychological investigation of the Szondi-test.) Schweizerische Zeitschrift für Psychologie & ihre Anwendungen, 1962, 21, 307-328.

By means of a projector, the entire series of Szondi pictures was presented to 25 Ss. Their pulse rates were electronically recorded on a polygraph during the picture presentation. Except for two Ss, there were no significant changes in pulse rates. By subsequent introspection the two Ss revealed that those pictures, on which the pulse rate variations occurred, awakened in them emotional memories of their youth.

698. Stone, L. J., & Hokanson, J. E. Arousal reduction via self-punitive behavior. Journal of Personality and Social Psychology, 1969, 12, 72-79.

This study is aimed at evaluating the hypothesis that cathartic-like, rapid arousal reduction associated with behavioral counterresponses to other's aggression is an acquired process. Specifically, the current design involved the use of a modified two-person interaction procedure in which subjects went through a series of interchanges with an "aggressive" partner (experimental confederate). The interpersonal contingencies were arranged so that by making intropunitive responses (self-administered electric shocks) the subject could avoid even more severe shocks from the partner. After this interpersonal learning situation the results showed that the partner's aggression tended to be met with intropunitive behaviors by the subject; and that these self-shock responses were accompanied by cathartic-like, vascular arousal-reduction.

699. Stone, W. N., Gleser, G. C., Gottschalk, L. A., & Iacono, J. M. Stimulus, affect, and plasma free fatty acid. Psychosomatic Medicine, 1969, 31, 331-341.

In healthy young men average levels of plasma free fatty acid (FFA) correlated with anxiety, which had been measured by content analysis of speech samples in an initial sample, but not with that measured in a second sample obtained during a 45-minute experimental period. The correlation was significant whether the first verbal sample was obtained immediately or 25 minutes after the beginning of the experimental period. A second verbal sample obtained at the 25- or 45-minute point in the session did not correlate with the average FFA per experimental session. Fasting FFA levels were lower in well-conditioned athletes as contrasted to nonathletes, and after nine hours, as opposed to 14 hours, fasting. The request for and production of a verbal sample acted as a stimulus effecting a rise in FFA. This rise correlated significantly with anxiety scores derived from the verbal samples. Typically anxious subjects showed the greatest FFA responsivity. The present group of college athletes had a minimal average FFA rise following venipuncture. They also showed decreased variability in FFA with repeated experimental exposure. These findings support the hypothesis that adaptation can occur.

700. Stotland, E. Exploratory investigations of empathy. In L. Berkowitz (Ed.), Advances in experimental social psychology. New York: Academic Press, 1969. Pp. 271-314.

In reviewing all the studies directly and indirectly related to empathy, the following conclusions can be drawn. It is possible to study so subtle and important a phenomenon as empathy in the laboratory and to examine some of the determinants of empathy. The process leading to empathy can be understood in terms of cognitive variables such as the mental set that the person has when he observes the other. The form or type of social relationships between one person and another influences the amount of empathy, presumably because the form of the social relationship influences the manner of perceiving the other and thinking about him. Individual differences in reactions to social situations, in perceiving the other, and in thinking about him must be considered in predicting how much empathizing will occur. These individual differences appear to be determined in part by the birth order of the person. For example, last borns (LBs) empathize more with someone similar to themselves than with someone different, while first borns' (FBs) empathy is not affected by the degree of similarity. Further, LBs empathize more with someone with whom they have interacted than with someone else, while FBs are not sensitive to this difference.

An attempt was made to relate empathy to physiological variables and self-ratings, but the findings were inconsistent.

701. Stoyva, J., & Kamiya, J. Electrophysiological studies of dreaming as the prototype of a new strategy in the study of consciousness. Psychological Review, 1968, 75, 192-205.

The authors argue that the combined use of physiological measures and verbal report -- as in the rapid eye movement (REM) studies of dreaming -- represents a new strategy in the study of private events. Electrophysiological studies of dreaming are seen as an instance of converging operations serving to validate a hypothetical mental state. The authors further argue for a redefinition of dreaming. The latter is not fully indexed by either the REM measure or by verbal report; rather it may be best thought of as a hypothetical construct. The possible ways of relating verbal reports of dreaming, the REM measure, and the hypothetical dream experience are placed within a systematic framework. That the new strategy - combined use of verbal report and physiological measures - need not be confined to dreaming is suggested by the experiments on learned control of the EEG alpha rhythm. Here, the use of information feedback procedures teaches S to control the physiological response and, apparently, the associated mental state as well.

702. Strahan, R. F. A study of speech anxiety. (Doctoral dissertation, University of Minnesota) Ann Arbor, Michigan: University Microfilms, 1967. No. 68-7390.

The delineation of speech anxiety behavior and the integration of such behavior with other psychological phenomena were the primary aims of this study.

The "Speech Experience Questionnaire" (SEQ) was developed to assess, by retrospective self-report, typical anxiety experience in public speaking. Three reliable scales were factor analytically derived and labeled "Fluency," "Nervousness," and "Inadequacy."

Intercorrelations of these specific-speech SEQ measures were quite like those of the typical-speech SEQ scales. The nearly invariable physiological response to speaking was heightened heart rate and skin conductance and lowered skin temperature. Across subject (R-type) correlations, however, were positive between conductance and temperature and negative between heart rate and both conductance and temperature. These moderate to strong associations indicate a surprising inverse functional relation between skin conductance and the other two physiological variables -- the larger the conductance increase, the smaller the heart rate increase and temperature decrease. Relationships between SEQ scales and physiological measures were seen only for the female sample, where moderate to strong positive correlations were found between heart rate and both Nervousness and Inadequacy.

Typical-speech SEQ scales correlated as expected with specific-speech scales, with generally strong associations in evidence between parallel measures. The typical-speech scales also related to the physiological measures much as did the specific-speech scales. These and other data were support for a congruence between the retrospective self-report and direct experimental approaches to the study of speech anxiety.

703. Straub, L. R., Ripley, H. S., & Wolf, S. Disturbances of bladder function associated with emotional states. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 1019-1029.

In a study of 26 patients, changes of bladder function productive of symptoms of urinary frequency on the one hand and retention on the other have been found to be correlated with variations in the emotional state and life situation. Moreover, changes have been demonstrated experimentally and measured during discussions of the relevant conflicts. The recognition of such psychosomatic phenomena involving the bladder depends not on the failure to identify a structural lesion but on the positive identification of situational conflicts which can be correlated with the bladder disturbance.

704. Streiner, D. L., & Dean, S. J. Expectancy, anxiety, and the GSR. Psychonomic Science, 1968, 10, 293-294.

Traditionally, CR magnitude in classical conditioning was thought to be dependent only upon properties of the CS and UCS. This study investigated the cognitive factor of S's expectancy of shock and his anxiety on GSR amplitude. Each S received 20 conditioning trials on a 50 percent random reinforcement schedule and had to state his expectation of shock before each trial. There was a significant correlation between verbalized expectancy and CR amplitude. High anxious Ss extinguished more slowly than low anxious Ss and had greater mean shock expectancies during acquisition.

705. Student, V. Blood pressure changes under experimental stress in aggressive and anxious depressive patients. Activitas Nervosa Superior, 1965, 7, 200-201.

Analysis of variance was made. It was found (at a 10 percent level of significance) that the aggressive group revealed during the affectogenic talk (which represented a certain kind of stress) a smaller systolic-diastolic pressure difference than the group of anxious depressives, which conforms with the cited hypotheses.

706. Summers, W. G. A new psychogalvanometric technique in criminal investigation. Psychological Bulletin, 1937, 34, 551-552. (Abstract)

The apparatus employed and the technique developed for the distinction of guilt from complicity and innocence have been described in a previous contribution. The present research presents the results of this apparatus and technique as applied to actual criminal cases. The cases included instances of murder, theft, assault, felonious entry and abduction.

707. Summers, W. G. Science can get the confession. Fordham Law Review, 1939, 5, 334-353.

A technique is presented that increases the efficiency of psychogalvanic response as an index of deception. The technique consists of presenting emotionally loaded but not significant (that is, not relevant to the crime under investigation) questions immediately preceding each significant question during the testing period. These former items are used as standards -- specifically responses to significant questions that exceed those given to the standards are considered indicative of deception.

708. Surwillo, W. W. Psychological factors in muscle-action potentials: EMG gradients. Journal of Experimental Psychology, 1956, 52, 263-272.

The main purpose of the present study was to test the hypothesis that slope of EMG gradients can be increased by raising the incentives in a task. Other related factors investigated were difficulty and goal structuring. A tracking task was administered as compensatory pursuit (Task A) and following pursuit (Task B). Both required almost identical forces and patterns of muscular response; muscular activity was limited to nearly isometric contractions.

Sixteen college students performed Task A and Task B in balanced order. Incentives were considerably higher in Task A, it was more difficult, and more strongly goal structured than Task B. EMGs from three of four muscles studied revealed steeper gradients for Task A. Control conditions showed that the increases could not be attributed to either variations in grip pressure or to muscular fatigue.

The study was repeated with 16 RCAF men. In this case, a third task with a higher incentive -- doubly rewarded Task A -- was introduced. Degree of muscular effort required in performance was also studied. Results indicated that incentive was the primary factor in raising the EMG gradient. Shape of gradients was invariant with the amount of muscular effort required for performance.

709. Surwillo, W. W. The influence of some psychological factors on latency of the galvanic skin reflex. Psychophysiology, 1967, 4, 223-228.

The purpose of this study was to examine the effect of differences in motivation and in attention on latency of the endosomatic GSR. Using verbal instructions, two different levels of motivation were induced in a group of 37 Ss who performed a simple reaction task in which they pressed a button whenever a 250 cycle tone was presented. The same tone also served as a stimulus for eliciting the GSR. In a second experiment, 42 different Ss performed a similar reaction task, but in this case the stimulus was the 250 cycle tone or a 1000 cycle tone of equal subjective intensity. Ss were asked to give a voluntary response to all tones irrespective of frequency and then, later on, to respond only when the 1000 cycle tone was presented.

Although voluntary reaction times were significantly shorter under conditions of high as compared with low motivation, latency of the GSR did not differ for the two conditions. In the second experiment, significantly shorter GSR latencies were recorded under the condition where Ss were required to pay closer attention to the stimulus.

710. Syz, H. C. Observations on the unreliability of subjective reports of emotional reactions. British Journal of Psychology, 1926, 17, 119-126.

The records of a previous psychogalvanic experiment upon 64 medical students were reexamined with a view to locating discrepancies between deflection and introspective report of the emotional experience. Fifty stimulus words indicative of a variety of life situations were used. Reactions were most frequent (84%) to the individual's name. Next in frequency were the responses to sex topics and school interests. Reactions to a repeated reading were about half as frequent as to the first. No subject reported more than 37% of his reactions; however, there are reports of emotional responses to many words where no deflection was registered. These cases were found to have a relationship with the topic. The most striking cases were: (1) Words traditionally associated with emotional responses, such as mother, father, ambitious. These gave a high frequency of "false" reports (i.e., unaccompanied by deflection). (2) Words the suppression of emotional reactions to which is traditionally demanded by the social environment, e.g., childish, lazy, and, markedly, sex topics. These yield a low frequency for all reports, true and false. On the basis of these findings it is pointed out (1) that psychogalvanic investigations have the serious defect of not differentiating between emotions; and (2) that a social factor keeps some emotional responses from awareness and leads to belief in others which are non-existent. A bibliography of eight titles is included.

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711. Taylor, S. P. The relationship of expressed and inhibited hostility to physiological activation. (Doctoral dissertation, University of Massachusetts) Ann Arbor, Michigan: University Microfilms, 1965. No. 65-11,526.

Provocation was manipulated in a competitive situation involving reaction time. The subjects were led to believe that they were competing with an aggressive opponent. They were told that they could determine the intensity of shock their opponents would receive on a particular trial, provided that they were quicker than their opponents, by adjusting a five-position switch before each trial. They were also informed that their competitors had the same prerogative. At the end of each trial, the subjects were able to judge the intensity of shock which their opponents intended for them to receive by observing which of the five lights flashed on their task board. Upon "losing," the subjects judged their opponents' intentions by observing which light flashed and by judging the intensity of the shock that they received.

The subjects found that their speed was approximately equal to that of their opponents. They also observed that the intensity of shock directed at them from their opponents continually increased.

The hypotheses concerning activation were only partially supported. Basal conductance was found to increase as a function of provocation. However, the average conductance level evidenced by the undercontrolled group increased faster and approached a higher asymptote as a function of provocation than the average conductance level of the overcontrolled group. The respiratory measures of activation were inconclusive.

712. Taylor, S. P. Aggressive behavior and physiological arousal as a function of provocation and tendency to inhibit aggression. Journal of Personality, 1967, 35, 297-310.

Provocation was manipulated in a situation where Ss believed that they were competing against an aggressive opponent.

It was observed that intensity of aggression varied directly with provocation. Self-rated undercontrollers (UCs) were more aggressive than overcontrollers (OCs) at all levels of provocation. The OCs produced a negatively and the UCs a positively accelerated curve of aggression as a function of provocation. Aggression was an additive function of actual punishment and of perception of the opponent's intended level of punishment.

Basal conductance of the UCs increased more rapidly and reached a higher final level than the basal conductance of the OCs. This finding is contrary to the hypothesis that people who characteristically inhibit their aggression experience greater tension than those who readily express their aggressive feelings.

713. Taylor, S. P., & Epstein, S. The measurement of autonomic arousal. Psychosomatic Medicine, 1967, 29, 514-525.

Empirical evidence is presented to demonstrate that there is no true relationship between such physiological measures as heart rate and skin conductance, but that (depending on circumstances) heart rate and skin conductance covary directly, inversely, or not at all. It is contended that a solution to the general measurement of arousal will not be found by transforming single measures, by innovations in data reduction, or by combining measures. Instead, the solution lies in learning more about the unique properties of different physiological systems by establishing how they vary as a function of the parameters of stimulus input -- such as intensity, rate of stimulation, and time since stimulus onset. A minor section of the report deals with the physiological correlates of threat.

714. Thackray, R. I., & Orne, M. T. A comparison of physiological indices in detection of deception. Psychophysiology, 1968, 4, 329-339.

Physiological measures -- breathing amplitude (BA), breathing cycle time (BCT), galvanic skin response (GSR), skin potential response (SPR), systolic blood pressure (BP), oxygen saturation level (O₂S), finger volume (FV), and pulse volume (PV) -- were compared with respect to their relative efficiency in discriminating deception in a lie detection experiment. Thirty Ss were tested. Stimuli consisted of personal words and neutral words made relevant in the context of a mock crime paradigm. Only GSR, SPR, and FV consistently discriminated better than chance, with GSR and SPR significantly superior to FV. BA and O₂S yielded some evidence of discrimination, but were inconsistent across stimulus material.

715. Thackray, R. I., & Orne, M. T. Effects of the type of stimulus employed and the level of subject awareness on the detection of deception. Journal of Applied Psychology, 1968, 52, 234-239.

An experiment was designed to compare detection of personal material with that of neutral material made relevant only in the experimental context. Each S acted the role of an espionage agent and attempted to conceal both his personal identity and certain code words he had learned. Personally relevant material was found to be significantly more detectable than the neutral material, although consequences of detection were the same for both types. In addition, the study attempted to provide exploratory data concerning physiological responsivity to lie-detection stimuli when Ss were unaware that responses were being monitored. While there was no evidence that detection was inferior under the nonaware condition, difficulties in achieving a completely convincing nonaware situation suggest caution in generalizing from these findings.

716. Thackray, R. I., & Pearson, D. W. Effects of cognitive appraisal of stress on heart rate and task performance. Perceptual and Motor Skills, 1968, 27, 651-658.

The effects of threat of shock on heart rate and motor performance were studied on Ss differing in previously expressed fear of shock. Twenty-four high fear-of-shock (HFS) and an equal number of low fear-of-shock (LFS) Ss were given 15 training trials on a conventional pursuit rotor. Following training one third of the Ss were informed that during subsequent trials shock would be administered if performance fell below training levels, one third were told that shock would be randomly administered, and the remaining third served as a control. No shocks were actually administered. HFS Ss revealed significantly greater heart-rate acceleration and performance impairment, but only under the condition in which Ss were told that receipt of shock would be contingent on prior performance level.

717. Thayer, R. E. Measurement of activation through self-report. Psychological Reports, 1967, 20, 663-678. (Monograph Supplement 1-V20)

While activation has proved to be a very useful concept in understanding behavior, theoretical and practical problems concerning physiological measurement have reduced its utility. Controlled self-report is suggested as an alternative measurement form, and data from several studies are presented indicating the validity of the Activation-Deactivation Adjective Check List (AD-ACL), an objective self-report measure of transient levels of activation. Factor analytic studies yielded four AD-ACL factors representing different points on a hypothetical continuum. These factors correlated substantially with physiological variables and reflected significant activation changes as predicted from diurnal sleep-wakefulness variations and from an impending college examination. The relative merits of self-report and individual peripheral physiological measures in the assessment of activation are discussed.

718. Thiesen, J. W. Effects of certain forms of emotion on the normal electroencephalogram. Archives of Psychology, 1943, No. 285

Two main problems were studied: the effect of emotion on the EEG and the possible relationships between EEG's from normal but emotional subjects and pathological EEG's. Rahm amplifying and recording units were employed, and all records were taken with the subjects' eyes closed. Special preliminary efforts were made to identify potentials of noncortical origin and to place electrodes so as to facilitate such identification during the major experiment. Emotion-arousing stimuli were the threat of an electric shock, a gruesome motion picture, and presentation of a live rat. Records were taken immediately after such presentations. A neutral film was employed as a control, as was an initial period before special stimulation. Ten subjects were used here. Three judges made qualitative ratings on the data, and quantitative analyses were also made. "In general, the changes in EEG . . . appear to be within the limits of normal electro-cortical activity."

719. Thiesen, J., & Meister, R. K. A laboratory investigation of measures of frustration tolerance of pre-adolescent children. Journal of Genetic Psychology, 1949, 75, 277-291.

Although these results of a laboratory study of frustration tolerance are based on a relatively small series of subjects intensively analyzed, the findings here reported demonstrate the usefulness of the method described and provide an estimate of the validity and general applicability of certain experimental measures of frustration tolerance. The most discriminating physiological criteria are the galvanic skin response differences from control to experimental period and similar pulse rate increases. Further, the findings suggest that a criterion of frustration tolerance based on a multiple behavior rating scale is more readily obtained and as meaningful as any index derived from one or more physiological measures. Such ratings have a significance beyond the experimental situation from which they were derived when interpreted in the light of the motivational aspects of the situation. Specifically there is evidence that the subject is motivated with regard to a particular frame of reference determined largely by the instructions on the task and the kinds of comments used. It is only within the relevant frame of reference that the experimentally derived estimates of frustration tolerance apply.

720. Thomas, E. L. Movements of the eye. Scientific American, 1960, 219 (2), 88-94.

A section of this article deals with eye-movement patterns while viewing pleasant stimuli and movies depicting aggressive behavior.

721. Thomas, E. L., & Stasiak, E. Eye movements and body images. Canadian Psychiatric Association Journal, 1964, 9, 337-345.

The eye-movement patterns of nine hospitalized psychiatric patients were compared with those of ten non-patients when looking at pictures of themselves and others. There were highly significant differences between both the mean fixation times of the two groups and also between the area of the body to which they paid the most attention. The mean fixation times of all the non-patients grouped closely around 0.61 seconds whereas the patients varied between 0.12 seconds and 0.47 seconds and 0.72 seconds and 1.04 seconds. Non-patients looked at all body levels, but spent much more time looking at the face. Patients on the other hand paid much more visual attention to the body and tended to avoid the face.

It is suggested that the variability in the fixation times and the tendency to avoid the face reflects a mechanism in the patient which is tending to avoid receiving information about certain aspects of the external world.

722. Tomes, H. The adaptation, acquisition, and extinction of empathically mediated emotional responses. (Doctoral dissertation, Pennsylvania State University) Ann Arbor, Mich.: University Microfilms, 1963. No. 64-1423.

Within this study, empathy has been defined as an interpersonal process which mediates concordant emotional responding in a S who believes another person with whom he is socially involved is undergoing painful stimulation. By concordant responding is meant that S makes a response which temporally appears to be related to noxious stimulation administered to the observed person. The method upon which this study was based is a two-person classical conditioning situation in which the performer's unconditioned emotional response (UER) served as UCS for S's emotional response (ER). Conditioning occurred when CS came to elicit ER in the absence or in advance of performer's UER. The anticipatory or conditioned ER (CER) was conceptualized as a learned empathic ER. S's galvanic skin response (GSR) was the dependent variable.

It was concluded that the ER could be elicited and conditioned on an empathic basis, that informing persons of a stimulus-shock relationship tended to facilitate empathic responsiveness, and that empathic responsiveness is enhanced by availability of cues arising from reactions of shock-stimulated persons. It was also noted that Ss unable to observe reactions of performers also consistently gave ERs but at a lower rate than Ss having visual cues available. It was therefore concluded that visual cues are important for empathic responding, but an observer must also have knowledge, belief, or awareness -- not necessarily first hand as can be seen from negative results yielded by shock-experience variable -- that when certain events are present the observed person will be made to feel uncomfortable.

723. Tong, J. E. Galvanic skin response studies of sex responsiveness in sex offenders and others. Journal of Mental Science, 1960, 106, 1475-1485.

The galvanic skin responses of disordered mental defective patients responding to a word association test were assessed in the light of the behaviour disorder shown. The primary response was found to differentiate Sex, Homosex, Violent and Miscellaneous patients at a high level of confidence, and other variations were found for habituation rates, and the habituation ratio of sex stimulus word and a fear stimulus. A dual index was present in 50 percent of the sex offenders but in none of the other groups and was somewhat associated with the nature of the sex disorder. Other differences observed include responsiveness to Rorschach colour and primary GSR in the sex group; a varying association of primary sex response with pain resistance (persistence) rating, and variations in responsiveness to Homosex words which indicated possible advantages in the usage of ambiguous stimuli.

724. Traxel, W. Die Bestimmung einer Unterschiedsschwelle für Gefühle. (Determination of a difference limen for feelings.) Psychologische Forschung, 1959, 25, 433-454.

A difference threshold for feelings can be determined by using, in lieu of stimulus magnitudes, measurable physiological feelings correlates. In this study skin resistance was used as the objectively defined variable. Forty male students were required to judge 23 pairs of stimulus word pairs for their magnitude of feeling value while skin resistance measurements were taken. A biserial correlation between skin resistance changes and judgments of feeling magnitude gave a statistically significant correlation. Results also made clear that a difference limen for feelings can be stated in units of a physiological correlate.

725. Traxel, W. Ueber die Bestimmung der Affektbetonung verschiedener Erlebnisinhalte. (The assessment of the affective load of experience.) Psychologische Beiträge, 1960, 4, 146-159.

Possibilities of applying the psycho-galvanic reaction in order to measure the affective load of experience are illustrated. Results of the experiments show that measuring the psycho-galvanic reaction is a workable method.

726. Traxel, W., & Wrede, G. Hautwiderstandsänderungen bei Musikdarbietung. (Changes in GSR while listening to music.) Zeitschrift für Experimentelle und Angewandte Psychologie, 1959, 6, 293-309.

The GSR of 30 students to three types of music (symphony, operetta, and jazz) was recorded and the results were compared. Fluctuations were strongest to jazz music, but the Ss preferred symphonic music. The discrepancy between emotional reaction and preference is traced to conventional group values.

727. Trovillo, P. V. A history of lie detection. (Part 1) Journal of Criminal Law, Criminology, and Police Science, 1939, 29, 848-881.

728. Trovillo, P. V. A history of lie detection. (Part 2) Journal of Criminal Law, Criminology, and Police Science, 1940, 30, 104-119.

The author concludes that the more means we have at hand to objectify our interviews with lie-suspects, the more we may expect to come to a correct interpretation of their status. For some people react under emotional stress in one way, some in another, and we have not yet advanced to the point where we can predict which of the body processes of any person will be most disrupted by emotion. If we could, our investigations would be easily and quickly concluded, for we could then select the weak spot in the system for analysis. We are at least certain today that fear of detection may in one person heighten the blood pressure, yet not disturb respiration or the electrodermal responses; in another person, it may effect only the respiration, or only the electrodermal reaction.

729. Tueting, P. A. Uncertainty and averaged evoked response in a guessing situation. (Doctoral dissertation, Columbia University) Ann Arbor, Mich.: University Microfilms, 1968. No. 69-3097.

The present study quantified and extended previous findings that amplitude of the averaged evoked response from scalp varied as a function of stimulus uncertainty in a guessing situation.

Complex amplitude and latency changes were found when subjects were required to predict the identity of the next stimulus in a sequence (either a low or a high pass click) compared to the condition where subjects were told prior to the trial what stimulus would be presented. The most pronounced finding was for the amplitude of P_3 (positive peak at 330 msec.), which was larger for the uncertain condition than for the certain condition.

The amplitude and latency of the averaged evoked response components also varied as a function of degree of stimulus uncertainty. Degree of stimulus uncertainty was manipulated by (1) varying the relative frequencies (absolute probability) of presentation of the low and high click alternatives and (2) by varying the sequential probability of stimulus alternatives (the probability of repetition, e.g., low after low and the probability of alternation, e.g., low after high).

The strongest relationship was found when the amplitude of P_3 was plotted as a function of the outcome, the joint probability of the occurrence of a given stimulus and a given guess. Amplitude was larger for low joint probability (rare events). This relationship was monotonic and was strongest for right guesses. The effect was weaker and intersubject variability was greater for wrong guesses.

730. Tursky, B., & Sternbach, R. A. Further physiological correlates of ethnic differences in responses to shock. Psychophysiology, 1967, 4, 67-74.

The effects of subjects' sets on autonomic functioning had previously been demonstrated when the sets were induced by explicit experimental procedure. It was hypothesized that implicit (non-verbalized) sets should likewise have physiological correlates. The hypothesis was tested by exposing subjects of four different ethnic groups, whose attitudes toward pain and pain expression are different, to an experimental procedure involving electric shock. Differences were found in resting mean heart rate and palmar skin resistance and face temperature levels, in palmar skin potential responses to repetitive shocks, and in correlations between thresholds and heart rate, skin resistance and skin potential levels. These results closely parallel the attitudinal differences, and together with previously reported findings of differences in upper thresholds and adaptation of the diphasic skin potential, strongly confirm the hypothesis that subjects' implicit sets influence their patterns of autonomic responses.

V

731. Vacchiano, R. B., Strauss, P. S., Ryan, S., & Hochman, L. Pupillary response to value-linked words, Perceptual and Motor Skills, 1968, 27, 207-210.

Pupillary measurements were taken on 12 Ss who viewed sequences of words reflecting values of high, low, and neutral importance to them. No significant relationships were found between most measures of pupil size and word value. Changes in pupil size between word pairs of different value were evenly divided between constrictions and dilations according to chance. This lack of supporting evidence for current theories of pupillometrics is discussed in terms of experimental research problems.

732. Valins, S. C. Emotionality and autonomic reactivity. (Doctoral dissertation, Columbia University) Ann Arbor, Mich.: University Microfilms, 1964. No. 66-1739.

Undergraduate volunteers were classified as high emotional or low emotional on the basis of their scores on three questionnaires. As an indication of autonomic reactivity, heart rate measurements were obtained when Ss were at rest, when they were waiting for a series of tones and a series of shocks, and immediately after each intensity of tone or shock.

Striking group differences were observed in heart rate reactions when anticipating noxious stimuli. Less emotional types increased in heart rate; more emotional types decreased. Differences between groups were significant when anticipating each of three shock intensities. There were ample indications that the cardiac deceleration of the more emotional Ss was not as great an autonomic reaction as the acceleration of the less emotional ones. Emotionality was then negatively related to autonomic reactivity in anticipation of noxious stimuli.

The subjective reactions of less emotional Ss indicated that, although they did discriminate physiologically between different shock intensities, they did not discriminate as well psychologically. Less emotional Ss rated the different shock intensities more alike in terms of pain and startle than did more emotional Ss.

733. Valins, S. Cognitive effects of false heart-rate feedback. Journal of Personality and Social Psychology, 1966, 4, 400-408.

This experiment was concerned with some of the cognitive effects of internal events. The objective was to ascertain whether the labeling of emotional stimuli would be affected by information concerning internal reactions. Ss viewed 10 slides of seminude females while hearing sounds that were allegedly their heart beats. One group of Ss heard their "heart rates" increase markedly to five of the slides and not change to the other five; a 2nd group of Ss heard a marked decrease in the bogus heart rate to five of the slides and no change to the other five. In comparison with the slides to which Ss did not hear a change in the bogus rate, the slides to which they heard a marked change, whether increased or decreased, were (a) rated significantly more attractive during the experiment proper and during a disguised interview conducted 4-5 weeks later, and (b) chosen significantly more as remuneration for experimental participation.

734. Valins, S. Emotionality and autonomic reactivity. Journal of Experimental Research in Personality, 1967, 2, 41-48.

Several recent experiments have found that in emotion-arousing situations, chronically unemotional individuals are more autonomically reactive than more emotional ones. The present experiment attempted to determine whether similar differences are manifested when Ss are anticipating and receiving varying intensities of neutral as well as noxious stimuli. Subjects who were psychometrically classified as unemotional were found to consistently increase in heart rate when anticipating noxious electric shock whereas the heart rates of more emotional Ss decreased. Contrary to expectations, the cardiac reactions of unemotional types were not relatively indiscriminate. No group differences in heart rate were observed in anticipation of neutral tone stimuli or in reaction to tone or shock.

735. Valins, S. Emotionality and information concerning internal reactions. Journal of Personality and Social Psychology, 1967, 6, 458-463.

It was hypothesized that emotional and unemotional individuals differ with respect to the utilization of internal sensations as cues. In comparison to unemotional Ss, emotional ones were expected to make more use of information concerning their internal reactions. Ss who were psychometrically classified as emotional or unemotional were shown 10 slides of seminude females while hearing a tape recording of sounds that were allegedly their heart beats. To five of the slides they heard a marked change in their "heart rates"; to the other five they heard no change. It was found that relatively emotional subjects labeled nudes as attractive or unattractive depending upon whether they thought their hearts had reacted. This effect was significantly less marked for unemotional subjects. These individual differences were still apparent two months later when subjects were allowed to choose photographs of the nudes as rewards.

736. Valins, S., & Ray, A. A. Effects of cognitive desensitization on avoidance behavior. Journal of Personality and Social Psychology, 1967, 7, 345-350.

It was suggested that the modification of avoidance behavior by systematic desensitization is dependent upon the manipulation of cognitions about internal reactions. Two experiments were conducted to determine whether such cognitions could affect snake-avoidance behavior. In both experiments Ss were led to believe that snake stimuli did not affect them internally. These Ss, in comparison to suitable control Ss, were later observed to manifest more approach behavior when confronted with a live snake. This effect was significant for Ss who were moderately frightened of snakes and for those who were more than moderately frightened.

737. Van Buskirk, D., & Marcuse, F. L. The nature of errors in experimental lie detection. Journal of Experimental Psychology, 1954, 47, 187-190.

Analysis was made of the Keeler Polygraph and Stoelting Galvanoscope records of 50 male Ss who were required, by the procedure used, to lie. It was found, reliability and validity being satisfactory, that the 14 errors encountered could be classified into three types. Post hoc analysis suggested that approximately 68 percent of the errors would be repeated. It was also found that poor records, as defined here, contributed disproportionately to the number of errors. Phenomenological data obtained from Ss seemed to indicate that apprehensiveness may be present in the laboratory. Discussion centered around the significance of the above findings and the use of different measurement techniques for different physiological indices.

738. van der Valk, J. M., & Groen, J. Electrical resistance of the skin during induced emotional stress. Psychosomatic Medicine, 1950, 12, 303-314.

GSR was measured in normal Ss and patients with various internal diseases under various conditions: initial resistance; a ten minute period of quiet; while answering a set of questions; during an interview in which the S's life history was discussed. Some differences were noted.

739. van der Valk, J. M., & Groen, J. An investigation of the electrical resistance of the skin during induced emotional stress in normal individuals, and in patients with internal diseases. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 279-296.

The electrical resistance of the skin against a direct current of constant low voltage was measured in normal individuals and in patients with various internal diseases, under the following circumstances:

I. Immediately after the connection of the subject into the circuit. The value thus obtained is designated as initial resistance.

II. When, for ten minutes after the connection of the subject, no external stimuli were applied and the subject was told not to move and not to speak.

III. During the next fifteen minutes when the subject was asked to answer a set of standard questions.

IV. During an interview, in which emotional material from the subject's life history was discussed with him.

The answering of a set of standard questions or the discussion of an emotional subject was found to decrease the skin resistance when the subject was given an opportunity to discharge his emotions in this way.

The registration of the skin resistance may be used as a method to measure tension in seemingly quiet individuals.

740. Vidulich, R. N., & Krevanick, F. W. Racial attitudes and emotional response to visual representation of the Negro. Journal of Social Psychology, 1966, 68, 85-93.

In a study of the physiological-emotional concomitants of scaled racial attitudes, sex and direction of extreme attitudes were found to be related to amount of GSR responsiveness to photographic stimuli of Negroes, of whites, or without human content. High-prejudiced and male Ss significantly over-responded physiologically to Negro stimuli only. High consistency between attitude direction, GSR responsiveness, and verbalized preferences for the stimuli was obtained.

741. Vogel, W., Raymond, S., & Lazarus, R. S. Intrinsic motivation and psychological stress. Journal of Abnormal and Social Psychology, 1959, 58, 225-233.

Twenty Ss were selected as strongly oriented toward achievement as opposed to affiliation, and 20 with the reverse pattern, representing as ideal cases as it was possible to select to contrast the two types of predominant motivations. Subjects were additionally divided into those who were successful and those who were unsuccessful within their motive sphere, and arranged in a factorial design. Half of the achievement oriented Ss were exposed to an achievement oriented type of stressor condition and half to an affiliation stressor condition. The affiliation oriented group was similarly divided and given the two stressor treatments. The arousal of stress was studied by means of autonomic reactions, including pulse, blood pressure, and GSR.

The results clearly support the view that the arousal of stress depends upon the relationship between the motive pattern and the type of stressor condition.

742. von Fieandt, K. Gefühl und Affekt als Gegenstand psychologischer Forschung. (Feeling and affect as subjects of psychological research.) Studium Generale Berlin, 1958, 11, 187-192.

The author reviews new research on the measurement of feeling and affect (bioelectrical measurement methods, the psychogalvanometer, GSR, EEG, and others) in relation to problems of neuroticism, frustration, and group behavior.

W

743. Wahlke, J., & Lodge, M. Psychophysiological measures of change in political attitudes. Paper presented at the meeting of the Midwest Political Science Association, Chicago, April 1971.

Despite the fact that this experiment produced measurable changes in political attitudes, and that these changes are readily interpretable in terms of what we know about the mechanisms of response to threat, nevertheless the changes were not great. It is fair to say that the subjects were not in any real sense directly engaged by the experience -- the threats remained remote and vicarious. For example, the size of heart-rate change produced by the threat sequence was on the average less than one-tenth the reaction normally evoked by the direct threat of electric shock. It follows that the hypotheses linking threat to specific changes in political attitudes have still to be tested more thoroughly. This will require the linking of direct to vicarious threat in experimental situations. If subjects are to be genuinely involved in the experimental situation, it is necessary that their expression of opinions have real consequence for them (e.g., the receipt of rewards or sanctions clearly hinging on their reactions), or (as demonstrated by Graham and his associates) that they be required not merely to voice beliefs about abstract propositions but to choose among alternative courses of action linked experimentally to their choice of verbal responses.

744. Wallerstein, H. An electromyographic study of attentive listening. Canadian Journal of Psychology, 1954, 8, 228-239.

In an experiment designed to investigate muscular activity during sustained attention, two groups of subjects were requested to listen to three successive presentations of a recorded detective story and philosophical essay.

Results showed rising gradients of tension from forehead and chin throughout the course of listening. Listening to the story tended to produce increases of greater magnitude than did listening to the essay. Forearm muscles failed to show any clear variations during listening.

The rising gradients of muscle tension may be associated with increasing comprehension or organization of incoming verbal material -- organization which may take place during attentive listening.

745. Walsh, T. M. The relationship of a verbal and autonomic process of perception outside of awareness: A systematic investigation of subception. (Doctoral dissertation, University of Massachusetts) Ann Arbor, Mich.: University Microfilms, 1964. No. 64-8051.

In the first part of the present experiment (Phase I), word recognition levels were determined for each S and the S was randomly assigned to one of five levels, i.e., 0%, 25%, 50%, 75%, and 99%. Recognition levels were established by systematically varying the light intensity of the presented word stimuli. Ten Ss constituted the sample at each of the five levels of word recognition for a total of 50 Ss. At the assigned recognition level, Ss were presented five emotional and five neutral word stimuli (Phase II). These words were presented three times, yielding a possible 15 responses for both GSR and verbal report. Verbal report and GSR responses were recorded.

The results indicate a confirmation of the hypothesis that: (1) in direct comparison to increasing levels of the percentage of word recognition, there is, significantly, a more persistent percentage of GSR over all levels; (2) the frequency of GSR responsiveness does not change significantly over all levels of word recognition; and (3) the magnitude of GSR to the emotional words does not change significantly over all levels of word recognition.

Findings indicate that at the 96% level of word recognition, verbal report is a more precise response measure to emotional words than GSR. However, the data further suggests that GSR is a more precise response measure at lower percentage levels of correct verbal report.

746. Ward, W. D., & Carlson, W. A. Cognitive dissonance, opinion change, and physiological arousal. Journal of General Psychology, 1964, 71, 115-124.

The notion that the induction of cognitive dissonance may be related to physiological arousal prompted this study. Forty-eight neuropsychiatric patients were presented with fabrications of authoritative information which was either consonant or dissonant with their previously assessed opinions. Heart rate and psychogalvanic response (PGR) differences were observed as the Ss were receiving the supposedly authoritative information and indicating their opinions. Significant changes of opinion were demonstrated, and there was suggestive evidence to support the hypothesis that the PGR index of arousal was related to the induction of cognitive dissonance. There were no differences among groups of schizophrenics, of neurotics, and of personality disorders in the extent to which opinion change occurred, the neurotics were the only group showing a significant change in PGR during the criterion period.

747. Webb, W. W., Matheny, A., & Larson, G. Eye movements as a paradigm of approach and avoidance behavior. Perceptual and Motor Skills, 1963, 16, 341-347.

Eye movements were recorded while Ss looked at items consisting of four horizontally arranged pictures. The pictures were small line-drawings of ordinary objects and scenes. Three of the pictures were affectively neutral, while the picture on either the right or left end was presumed to be affectively important. It was anticipated that the gradients of time-spent-looking would approximate Miller's approach and avoidance gradients. In three exploratory sub-studies, the results were interpreted as confirmatory.

748. Weiner, H. Some psychological factors related to cardiovascular responses: A logical and empirical analysis. In R. Roessler & N. S. Greenfield (Eds.), Physiological correlates of psychological disorder. Madison: The University of Wisconsin Press, 1962. Pp. 115-141.

Our conclusions reached to date are that the specific psychological manipulations in the form of simple or complex stimuli which are designed to elicit physiological lability do so by modifying ongoing physiological and psychological processes rather than initiating discrete changes from a stable, nondynamic base-line state. The data suggest that the entire social context and setting of the experiment, the subject's anticipation of and feelings about this role, influence responsivity on both levels. Once in the laboratory, his manner of coping with being a subject and the interaction with the experimenter as well as his manner of dealing with the "stimuli" play crucial roles in determining whether physiological responses will occur. Once he has interacted with the examiner, we have observed in healthy subjects appropriately executed task-oriented behavioral responses and primarily nonspecific physiological changes whose duration is roughly equivalent to the duration of the applied task. Upon these are engrafted the subject's individual and experimentally determined responses to the T.A.T. card, his recognition of the appropriateness of his communication to the experimenter, and his manner of coping with spontaneous and inappropriate responses. Furthermore, the act of communicating in itself and attempts to communicate only socially appropriate or personally nonrevealing contents are correlated with physiological lability.

749. Weinstein, E., Abrams, S., & Gibbons, D. The validity of the polygraph with hypnotically induced repression and guilt. American Journal of Psychiatry, 1970, 126, 143-146.

The authors tested the polygraph's validity by hypnotically inducing repression and guilt in six subjects. They conclude that an individual who has committed a crime may repress this experience sufficiently to pass the polygraph test, while an anxious individual who has not committed a crime may render a falsely positive response on the machine. The authors discuss their conclusion that the polygraph is not foolproof in terms of implications for law enforcement agencies.

750. Weinstein, J., Averill, J. R., Opton, E. M., Jr., & Lazarus, R. S. Defensive style and discrepancy between self-report and physiological indexes of stress. Journal of Personality and Social Psychology, 1968, 10, 406-413.

The influence of defensive style on discrepancies between self-report and autonomic indexes of stress was investigated in a reanalysis of six experiments. As predicted, repressors showed relatively greater autonomic than self-report reactions to stress, while sensitizers tended to show the opposite pattern of response. These results were due primarily to the influence of defensive style on self-reports. Both types of defense were equally effective (or ineffective) in controlling autonomic reactions. Implications for the psychophysiological investigation of stress and emotion are discussed.

751. Weiss, B. Electrocardiographic indices of emotional stress. American Journal of Psychiatry, 1956, 113, 348-351.

The literature on electrocardiographic indices of emotional stress is reviewed in order to derive possible generalizations from them. These are suggested and certain cautions concerning their acceptance are suggested. A conditioning paradigm of anxiety is offered as an experimental test of such generalizations.

752. Wells, F. L. On certain electrical processes in the human body and their relation to emotional reactions. Archives of Psychology, 1911, 2, 1-39.

Study reviews literature and experimental studies relating emotional intensity to GSR. One of the studies discussed in detail relates subject's evaluation of emotional intensity of words with GSR response.

753. Wenger, M. A., Averill, J. R., & Smith, D. D. B. Autonomic activity during sexual arousal. Psychophysiology, 1968, 4, 468-478.

Autonomic activity was recorded from 16 male subjects as they read sexually stimulating material. The resulting physiological response patterns included increases in systolic and diastolic blood pressures, palmar conductance and number of galvanic skin responses. Heart and respiration rates remained relatively constant, and there was some indication of peripheral vasodilatation subsequent to initial constriction. The results suggest a differential change in the activity of both branches of the autonomic nervous system, in which neither the parasympathetic nor the sympathetic nervous system may be considered dominant.

754. Werre, P. F. The relationships between electroencephalographic and psychological data in normal adults. Leiden, Holland: Universitaire Pers, 1957.

An exhaustive review of the literature since Berger is presented. EEG protocols and personality descriptions derived from a psychological test battery are presented for 24 Ss. A method of graphic representation of the relative amounts of alpha, beta, and theta activity is employed, and relationships between the EEG data and characteristics extracted from the psychological data are sought. "(I)t is tentatively concluded that there are no unique associations between any single electroencephalographic variable and any specific psychological parameter Nevertheless, the coordinate representation of electroencephalographic and psychological attributes suggests that certain electroencephalographic patterns are contingent upon a definite measurable psychological grouping."

755. Werre, P. F., & Barendregt, J. T. Correlations between some electroencephalographic and psychological variables. Confinia Psychiatrica, 1963, 6, 181-190.

For a group of 28 normal subjects (25-45 years) correlation coefficients (Kendall's tau) between four EEG variables, obtained by means of "wave duration analysis," and three groups of psychological parameters relating to neuroticism, extroversion and rigidity were calculated. Most of the correlations proved to be insignificant, but some trends became apparent. The results of a small cross-validation study corroborated one trend and another one only partially. The results taken together are still too small to warrant conclusions, but they are considered to justify further research.

756. Werre, P. F., de Lange, J. W., & Van Leeuwen, W. S. The relationships between electroencephalographic and psychological data in normal adults. Electroencephalography and Clinical Neurophysiology, 1959, 11, 611. (Abstract)

This investigation pertains to the association of data obtained by elaborate EEG and psychological examinations of 24 normal adult subjects. The psychological data were obtained by means of the Rorschach, Four Picture and Wiggly Blocks tests and by an interview.

It is concluded that there are no unique associations between any single EEG variable and any specific psychological parameter, whereas the combination representative of EEG and psychological attributes strongly suggests that certain EEG patterns are contingent upon a definite measurable psychological grouping.

757. Westie, F. R., & De Fleur, M. L. Autonomic responses and their relationship to race attitudes. Journal of Abnormal and Social Psychology, 1959, 58, 340-347.

The problem was to determine if autonomic response was associated with exposure to objects toward which individuals have (scale-measured) attitudes. That is, do persons who are unfavorable in their verbal response to Negroes also manifest different autonomic responses to slides portraying Negroes than do those more favorable in their verbal response? The 46 subjects, half of whom were males and half females, were divided into a prejudiced and unprejudiced group on the basis of a verbal attitude test. They were then exposed to photographic slides portraying Negroes and whites in various combinations of race and sex. The finger pulse and GSR activity of each subject was recorded during these presentations.

The data indicate that greater GSR responses (but smaller FP responses) were given to Negro slides by prejudiced subjects, but the autonomic activity was influenced by the sex of the subject as well as the race and sex characteristics of the stimulus slides. Such autonomic activity may be considered as another dimension of attitudinal behavior to be considered along with the verbal and overt action dimensions. Additional research is needed before simple meaning can be assigned to the involvement of autonomic activity in attitudinal behavior.

758. Weybrew, B. B. Psychological and psychophysiological effects of long periods of submergence. Report No. 281, 1957, Naval Medical Research Laboratory. AD No. 272611.

The purpose of this study was to assess some of the psychological and psychophysiological changes observed in a representative sample of men from the crew of the USS NAUTILUS during an 11-day, completely submerged, cruise.

Thirty enlisted men were tested daily with respect to visual sensitivity and muscular tension. In addition, heart and respiratory rates, and self-ratings with respect to 28 fatigue-like variables were also obtained daily. These data indicated that optimal adaptation to the submerged conditions was maintained until the 6th to 8th days, after which insomnia, headaches, excessive tension, and lowered motivation became more apparent, but not to the extent of serious debilitation.

759. Weybrew, B. B. Patterns of reaction to stress as revealed by a factor analysis of autonomic-change measures and behavioral observations. Journal of General Psychology, 1959, 60, 253-264.

Eighty-one male candidates for prison guard were exposed to a stress situational test necessitating their completing a task despite deliberate attempts of role players to frustrate them. Eleven peripheral measures of autonomic balance such as blood pressure, dermographic latency, skin temperature, pupil diameter and so on, were taken before and after the stress situation.

The ANS difference scores were intercorrelated with observer ratings with respect to Hostility, Stress Tolerance, and Overall Adjustment, obtained during the stress. The resulting 18 x 18 matrix was factor-analyzed. Four orthogonal group factors were extracted, the first and fourth of which suggested a sympathicotonic reaction pattern, and the third a synergic ANS factor. High stress tolerance and overall favorable adjustment to stress loaded the second factor which was loaded by only one ANS variable, pupil constriction. The third factor appeared to be on ANS synergic reaction.

760. Weybrew, B. B. Autonomic resiliency, subjective symptomatology, and submarine stress. Memorandum Report No. 63-13, 1963, U. S. Naval Medical Research Lab., Navy Department Research Project MR005.14-2100-3.05.

Minor sections of this report deal with the relation between subjective indices of feelings and attitudes of submarine crews and physiological variables.

761. Weybrew, B. B. Selection of men for hazardous duty from indices of individual differences in autonomic nervous system reactivity. AD624783, 1965, Bureau of Medicine and Surgery, Navy Department.

The aim of this study was to integrate the results of a series of studies aimed at assessing the validity of peripheral autonomic indices (respiration rate, tremor, palmar conductance, etc.) for predicting individual differences in adjustment to a stressful environment.

Based largely upon palmar electrodermal indices, autonomic displacement and recoverability to laboratory-induced stress has moderate to high predictive validity with respect to submariner adjustment ratings. Functional autonomic differences may therefore be indicative of underlying emotional traits which in turn are related to differences in adjustment to certain hazardous environments.

762. Weybrew, B. B. Patterns of psychophysiological response to military stress. In M. H. Appley, & R. Trumbull (Eds.), Psychological stress: Issues in research. New York: Appleton-Century Crofts, 1967. Pp. 324-362.

This review is primarily concerned with ". . . major military studies which focus upon psychophysiological measurement involving mainly human subjects under laboratory or field conditions, interpreted for the purposes of the experiment as stressful or stress-inducing." Material is also presented linking physiological variables with subjective evaluations of stress, morale and other attitudinal elements.

763. Weybrew, B. B., & Alves, E. D. An exploratory study of the relationship of autonomic resiliency to manifest anxiety and selected personality traits. U. S. Naval Medical Research Laboratory Report No. 307, 1959.

This paper examines the interrelationships of several derivatives of electrodermal conductance measures to personality trait ratings, with a view toward determining the feasibility of such measures as predictors of ability to withstand the stresses of long submergence.

Basal conductance levels, recovery indices, and indicators of autonomic lability (all derived from electrodermal conductance changes following hyperventilation and breathholding) were found to be correlated with traits related to emotional stability and over-all adaptability. As a whole, the findings suggest that derivatives of electrodermal conductance measures may be usefully valid predictors of over-all emotional stability.

764. Weybrew, B. B., Greenwood, M., & Parker, J. W. Psychological and psychophysiological effects of confinement in a high-pressure helium-oxygen-nitrogen atmosphere for 284 hours. Report No. 441, 1964, Bureau of Medicine and Surgery, Navy Department.

This study attempted to determine whether peripheral indices of autonomic nervous system function would show differential change patterns in three men who were confined for approximately twelve days in an atmosphere of helium, oxygen, and nitrogen at a pressure equal to seven atmospheres (as would be experienced at a depth of 200 feet in the sea).

The three men showed different patterns of autonomic reactivity and recoverability as the experiment progressed. These differences may be related to the potentiality of men to adjust to confinement in a hyperbaric, gaseous environment of the composition used in this experiment.

Capacity to adjust to prolonged confinement to a deep sea environment as in underwater laboratory stations may be related to emotional responsivity to the total situation. Suggestions as to the kind of person who adjusts optimally to these conditions are provided.

765. White, E. H. Autonomic responsivity as a function of level of subject involvement. Behavioral Science, 1965, 10, 39-50.

Hypotheses being tested predicted that levels of S involvement would have differential effects on autonomic responsivity and on ANS response specificity, and the corollary, that manifest anxiety, as measured by the Taylor Scale, would be related to S's ability to differentiate levels of involvement. Effort was made to control the degree of S involvement by manipulating difficulty of task, structuredness of task, and consequences to the S. A series of stimulus situations representing different levels of S involvement was devised. It was believed that Ss could differentiate these levels both subjectively and physiologically. High- and Low-Anxiety groups were examined separately and individual analyses made of each S. Only 13% of High-Anxiety, but about 50% of Low-Anxiety, Ss differentiated significantly in physiological reactivity among all five levels of involvement.

766. Wiener, G., Salpeter, M. M., Tobach, E., Wineburg, E., & Welch, L. The effect of the experimental situation on the amplitude of the psychogalvanic response in humans. Journal of General Psychology, 1952, 47, 213-225.

Twenty-four college women were presented in experimental and non-experimental situations with a yellow pilot light, a nonsense syllable, and a square of white light as stimuli. No significant differences were found between responses to the same stimuli in the experimental and non-experimental situations. It seemed that the attitude of the S toward the experimental nature of the situation, rather than the experimental situation per se, is more instrumental in affecting the amplitude of the PGR.

767. Wilkinson, R. T. Sleep deprivation. In O. G. Edholm & A. L. Bacharach (Eds.), Physiology of survival. New York: Academic Press, 1965. Pp. 399-430.

Report reviews biochemical, physiological, performance and general behavioral changes that are associated with sleep deprivation. In the section dealing with performance and behavioral changes work is cited that indicates that "a social attitude of negative affect" and "hostility towards others of a group" is associated with lack of sleep.

768. Willers, K. R., & Hokanson, J. E. Vascular concomitants of direct and vicarious aggression. Unpublished manuscript, Florida State University, (undated)

An attempt was made to evaluate the arousal-reducing effects of two forms of vicarious aggression. In a "small group" situation, Ss were provoked via a series of electric shocks from a "fellow subject" for presumably inadequate performance on a counting task. Immediately following this provocation, subjects in a "direct-vicarious aggression" condition observed someone else similarly attack the provocateur, while Ss in an "indirect-vicarious" condition observed an unrelated person receive the same harassment. The arousal-reducing effects (systolic and diastolic blood pressure reductions) of these vicarious treatments were compared with the effects of direct counter-aggression and a no-aggression control group. The results suggest that vicarious aggression is arousal-reducing while the actual observation of aggression is taking place; and direct aggression has arousal-reducing effects, but only after the aggressive behaviors are completed.

769. Williams, A. C., Jr. Some psychological correlates of the electroencephalogram. Archives of Psychology, 1939, No. 240.

Depression of alpha was found to depend upon at least two factors designated as stimulation and attention to stimulation. Attention without stimulation produced no depression. However, with both factors present a change in either factor alone resulted in corresponding change in the amount of alpha activity. It was concluded that the factors are mutually dependent and tend to occur together but that they are not identical.

Facilitation of the alpha rhythm was found to accompany a third factor characterized as a change in the general psychological state of the subject. It occurred following the induction in the subject of states of awareness, attentiveness, readiness, relaxation, etc. Facilitation appeared as bursts of high amplitude, regular, alpha waves, clearly distinguishable from the level of alpha activity in other portions of the record. The general psychological states were induced by unexpected questioning of the subject, ready signals, the completion of a task, instructions for a task, etc. It was found that the facilitation response adapted upon repetition of the situation inducing it. Individual differences in the facilitation response were found, one out of the seven subjects used showed no facilitation.

770. Williams, J. A. Novelty, GSR, and stimulus generalization. Canadian Journal of Psychology, 1963, 17, 52-61.

The novelty or unexpectedness of a stimulus change evokes a marked GSR. Such novelty-produced GSRs must confound the results of experiments which require a stimulus change from the training to the test trials. In the present investigation, the contributions of novelty-evoked GSRs in a procedure parallel to that typically used in stimulus generalization experiments was studied. Twenty-four Ss were given 16 training presentations of a training tone S_0 , followed by a test series of one permutation of four tones different from S_0 . No UCS was paired with either the training or test stimuli. All possible permutations of the test tones were used. Training and testing were repeated a second time.

The resulting conductance-change scores showed: (1) a marked increase in skin conductance on test trials, attributable to the novelty of the tone changes; (2) a clear tendency for GSR magnitudes to be ordered as a function of increasing familiarity with the tone change; and (3) a lesser, but consistent tendency for response magnitudes to be ordered according to the degree of change from the training to the test tone.

771. Williams, T. A., Schachter, J., & Rowe, R. Spontaneous autonomic activity, anxiety, and "hyperkinetic impulsivity." Psychosomatic Medicine, 1965, 27, 9-18.

In a psychophysiology study of the relationships between spontaneous resting cardiac and sudomotor activity, visual-motor performance, and ratings of "emotional" and "behavioral impulsivity," attempts to reproduce correlations originally reported by Lacey and Lacey were partially successful. Cardiac "labiles" tended to exhibit superior visual-motor performance. Sudomotor lability was not predictive of visual-motor performance, although skin resistance level was. No relationships were found between clinical impulsivity and visual-motor performance or physiology. Succeeding subjects exhibited progressive change in autonomic responsiveness and visual-motor performance. This subject order effect was presumed to reflect systematic diminution in test-induced anxiety. It was concluded that the relationships between cardiac lability and visual-motor performance were a function of individual differences in response to test stress.

772. Wilson, G. D. Arousal properties of red versus green. Perceptual and Motor Skills, 1966, 23, 947-949.

Twenty Ss were each exposed for 60 seconds to five red and five green slides in alternating order. Two electrodermal measures, conductance level and GSR, were taken. Results support the hypothesis that red is a more "arousing" color than green, the effect being particularly apparent in the GSR data ($p < .002$).

773. Wilson, G. D. An electrodermal technique for the study of phobias. New Zealand Medical Journal, 1966, 65, 696-698.

An outline is given of some preliminary attempts to observe phobias by measuring GSRs to pictorial representations of the phobic target presented tachistoscopically through a translucent screen. A control experiment on nonphobic Ss is described, and the responses of two phobic Ss used to illustrate the procedure.

774. Wilson, G. D. GSR responses to fear-related stimuli. Perceptual and Motor Skills, 1967, 24, 401-402.

GSR responses to a set of tachistoscopically presented color slides were compared for 10 Ss who reported intense fear of spiders and 10 Ss admitting no unreasonable fears. Employing the index, ratio of response to spider-pictures over response to neutral stimuli (landscapes), perfect discrimination between the two groups of Ss was obtained.

775. Wilson, G. D. Reversal of differential GSR conditioning by instructions. Journal of Experimental Psychology, 1968, 76, 491-493.

GSR was conditioned to a blue light (CS+) using mild shock as UCS and a 50% reinforcement schedule, while a yellow light (CS-) was presented an equal number of times without reinforcement. After conditioning was established, instructions designed to reverse the significance of CS+ and CS- were given, followed by a test series with both stimuli unreinforced. Results showed a sudden reversal of the differential conditioning, GSRs of greater magnitude being evoked by CS-. These new CRs did not extinguish but tended to increase in magnitude over nonreinforced test trials. A two-component theory of autonomic conditioning was not supported; the CR appeared to be fully ascribable to Ss' anticipation of shock.

776. Wilson, J. W. D., & Dykman, R. A. Background autonomic activity in medical students. Journal of Comparative and Physiological Psychology, 1960, 53, 405-411.

A section of this report deals with differences in autonomic responses to emotional and nonemotional questions.

777. Wilson, R. S. Cardiac response: Determinants of conditioning. Journal of Comparative and Physiological Psychology Monograph, 1969, 68 (Whole No. 1, Part 2).

Five variables were manipulated in a pulse-rate conditioning study: CS duration, trace vs. delay procedures, order of presentation of CS, US, and CS-US trials, blocked vs. randomly mixed trials, and shock vs. noise US. One hundred ninety-two Ss were distributed across 12 conditions. The form of the cardiac response during extinction was a composite of the spontaneous response to the tone CS plus the conditional deceleration established by training. Conditioning efficiency was maximized by giving the training trials first, and by using a five-second CS-US interval. An outline of the factors influencing cardiac conditioning is presented, and this outline is congruent with the theoretical analysis of classical conditioning proposed by Dykman and Grings.

778. Winer, R. A., Chauncey, H. H., & Barber, T. X. The influence of verbal or symbolic stimuli on salivary gland secretion. Annals of the New York Academy of Sciences, 1965, 131, 374-383.

A series of investigations was undertaken to determine the effect of verbal or symbolic stimulation on the gustato-salivary reflex. Parotid gland secretion rate was utilized to measure human response to gustatory stimuli. The effect of two gustatory submodalities (sweet and sour) was evaluated during three separate controlled experiments with and without suggestions, and with and without hypnosis.

The initial investigation was undertaken to determine the effect of verbal suggestions on a group of awake subjects who were judged relatively non-suggestible, as determined by a standardized suggestibility test.

In the second study the parotid secretion rate was measured in a group of awake subjects, half who were judged highly amenable to suggestion and half who were judged relatively nonamenable to suggestion. The third study was undertaken to determine whether greater alterations in parotid secretory rate were produced when suggestions were given under hypnotic rather than nonhypnotic, awake conditions.

779. Wing, L. Physiological effects of performing a difficult task in patients with anxiety states. Journal of Psychosomatic Research, 1964, 7, 283-294.

Skin conductance (background level and spontaneous fluctuations), pulse rate and EMG from the right forearm extensor muscles were recorded in 20 patients suffering from anxiety states, while anticipating and during performance of a continuous, high speed color naming task. The same readings were made on 20 control Ss matched for age and sex. The patients tended to show higher levels of physiological activity than normal controls . . . with the exception of GSR fluctuations. The change scores were not significantly different for the two groups in pulse rate and skin measures, but were significantly higher for the controls on EMG. The controls tended to recover more rapidly after the task on the autonomic measures, but not on the EMG. The controls did better than the patients on the color naming test. The results are discussed in the light of the theory of behavioral 'arousal' or 'activation.'

780. Winter, W. D., Ferreira, A. J., & Ransom, R. Two measures of anxiety: A validation. Journal of Consulting Psychology, 1963, 27, 520-524.

Nineteen undergraduates were subjected to two conditions of low anxiety, two of experimentally produced high anxiety, and two of examination anxiety. During each situation, the Ss were administered the Affect Adjective Check List (AACL) and the Palmar Sweat Index (PSI), and later the Taylor MA scale. The findings were: (a) both the AACL and PSI validly reflected anxiety; (b) both yielded stable scores characteristic of the S; (c) PSI did not correlate with AACL; (d) MA scale correlated with AACL, but not with PSI; (e) PSI and AACL responded differently to examination anxiety; (f) on the PSI, certain fingers seemed to sweat more than others. These findings indicate a lack of congruence between these verbal and physiological anxiety measures.

781. Wolf, S., & Glass, G. B. J. Correlation of conscious and unconscious conflicts with changes in gastric function and structure. Observations on the relation of the constituents of gastric juice to the integrity of the mucous membrane. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 665-676.

This report concerns an extension of studies of gastric reactions to spontaneously occurring day to day stresses in the life situation of the fistulous subject Tom. Attention was focussed upon the subject's degree of awareness of his conflicts and it was observed that although important conflicts were apparently more likely to be suppressed than unimportant ones, the occurrence of significant alterations in gastric function with symptoms depended upon the comparative importance of the conflict rather than whether it was conscious or unconscious.

The measured indicators of gastric function which were correlated with attitudes and reactions included not only acidity but pepsin, lysozyme concentration and the concentration of the mucin constituents, mucoprotein and mucoprotease.

782. Wolf, S., & Shepard, E. M. An appraisal of factors that evoke and modify the hypertensive reaction pattern. Proceedings of the Association for Research in Nervous and Mental Diseases, 1950, 29, 976-984.

Eighty-nine subjects with essential hypertension have been studied both clinically and experimentally over a period of from one to five years. Careful scrutiny of episodes of significant change in arterial pressure showed that a rise occurred in a setting where strong conscious or unconscious needs to express hostile aggression were blocked by equally powerful needs to placate and keep peace. Lowering of blood pressure occurred in association with relatively free expression of aggression. In seven apparently hypertensive subjects a pronounced lessening of restraint was accompanied by restoration of the blood pressure to normal.

783. Wolff, H. G. Life situations, emotions, and bodily disease. In M. L. Reymert (Ed.), Feelings and emotions. New York: McGraw-Hill, 1950. Pp. 284-324.

The article reviews a number of physiological changes that accompany various attitudes; among them are:

During assaults or threats arousing conflict with anger and a pattern of offense, the stomach prepares itself for eating with increased blood flow, acid secretion, and motility. The gastric mucosa may become turgescient and the blood vessels friable.

In reactions to assaults, threats, or symbols arousing conflicts charged with resentment and hostility, a protective pattern of defense involving the large bowel may precipitate a disastrous chain of events. With violent contractions, increased concentrations of mucolytic enzyme, and increased fragility of the mucous membrane, this membrane may erode and ominous hemorrhage ensue.

Conspicuous among defensive protective reactions are those involving the nose and airways. It has been observed that in reaction to assault, certain individuals occlude their air passages and limit the ventilatory exchange by vasodilatation, turgescence, hypersecretion, and smooth and skeletal muscle contractions. Also a nonparticipation behavior pattern and attitude are exhibited in interpersonal relations.

Offensive protective reactions involving chiefly the cardiovascular and renal systems were exhibited in certain aggressive individuals. These persons, in reaction to assault, mobilized their equipment, causing the work of the heart to be greatly increased through increased rate, output, and peripheral resistance.

784. Wolff, H. G., Grace, W. J., & Wolf, S. Life situations, emotions, and the large bowel. Transactions of the Association of American Physicians, 1949, 62, 192-195.

The data adduced from the study allowed of the following inferences.

(1) In four fistulous subjects, the colon was found to participate in reactions to stressful situations. The subjects with ulcerative colitis were found to display more frequent and sustained changes in colonic function than did the subjects whose colons were apparently free of disease.

(2) The "gastrocolic reflex" appears to be a conditioned response rather than a simple neural reflex.

(3) Stressful life situations provocative of conflict, anger, resentment and hostility or anxiety and apprehension were found to be associated with hyperfunction of the colon manifested by hyperemia, hypermotility and increased secretion of the enzyme, lysozyme.

(4) Overwhelming situations provocative of abject fear and dejection were associated with hypofunction of the large intestine with pallor, relaxation, lack of contractile activity and relatively low concentration of lysozyme in the colonic secretion.

785. Wolff, H. G., Lorenz, T. H., & Graham, D. T. Stress, emotions and human sebum: Their relevance to acne vulgaris. Transactions of the Association of American Physicians, 1951, 64, 435-444.

It is demonstrated that facial surface sebum fluctuates quantitatively in association with certain specific types of emotional stress in patients with acne vulgaris. Data are presented that demonstrate the close correlation between life stress, feeling states and clinical acne vulgaris.

786. Wolff, H. G., Wolf, S., Grace, W. J., Holmes, T. E., Stevenson, I., Straub, L., Goodell, H., & Seton, P. Changes in form and function of mucous membranes occurring as part of protective reaction patterns in man during periods of life stress and emotional conflict. Transactions of the Association of American Physicians, 1948, 61, 313-334.

The changes in form and function occurring in various mucous membranes during stress in humans have been studied. Stress in these instances involved emotional conflict characterized by such feelings as anxiety, resentment, anger, fear, and frustration. The mucous membranes investigated were those of the stomach, the vagina, the bladder, the large bowel, the nose, and the bronchi. Though the reactions differed in each of the tissues, the resemblance among them was striking enough to justify dealing with them as a group.

787. Woodmansee, J. J., Jr. An evaluation of pupil response as a measure of attitude toward Negroes. (Doctoral dissertation, University of Colorado) Ann Arbor, Mich.: University Microfilms, 1965. No. 66-3299.

The study reported here was designed to discover whether the pupil reaction is related to the expression of a controversial social attitude. Twenty-two female subjects who were known to differ in their attitude toward Negroes looked at six stimulus pictures while their left eye was photographed at the rate of two frames per second. Four of the five stimuli were scenes of Negroes and whites in a variety of situations; the fifth stimulus was the scene of a filthy toilet. The sixth stimulus was a control picture which preceded each of the other five stimuli. The basic datum was the change in pupil diameter from the presentation of a control stimulus to the presentation of each life-content stimulus expressed as a per cent of the pupil diameter during the preceding control stimulus. Using Hess' experimental method the control and life-content stimulus pairs were presented once, and the PR scores for the four Negro content stimuli were combined for a single attitude score on each subject. The average PR to each stimulus was -0.10% for the anti-Negro subjects (N = 11) and +2.65% for the equalitarian subjects (N = 11). These means differed in the direction predicted by Hess ($p < .01$; one-tailed hypothesis).

Much of the effort in this investigation was given to a study of pupillary movement phenomena and the methodological problems of evaluating the pupil reaction. A review of the literature and several exploratory studies revealed that there are several problems which must be considered in the design of pupillographic experiments.

788. Woodmansee, J. J. Methodological problems in pupillographic experiments. Proceedings of the 74th Annual Convention of the American Psychological Association, 1966, 1, 133-134.

An attempt to evaluate the pupil reaction as a measure of attitude toward Negroes disclosed that the light reflex is but one of several potentially confounding influences in pupillographic studies. The purpose of this report is to outline these problems and suggest their solution.

789. Woodmansee, J. J. The pupil reaction as an index of positive and negative affect. Paper presented at the meeting of the American Psychological Association, Washington, D. C., September 1967.

This paper describes a group of studies that were conducted to assess the effectiveness of pupillary constriction as an indication of negative affect. No evidence of constriction was obtained in three studies. There was some indication of success in a fourth study discussed but this latter finding was not unequivocal.

790. Woodmansee, J. J. The pupil response as a measure of social attitudes. In G. Summers (Ed.), Attitude measurement. New York: Rand-McNally, 1970, in press.

The purpose in this paper has been to judge the potential of the pupil reaction as a measure of social attitudes.

In Study A subjects who were known to differ greatly in their attitude toward Negroes were shown a group of pictorial stimuli while pupillary changes were recorded. The stimuli were known to arouse differing feelings among the subjects' racial attitude. According to Hess, after viewing the pictures several times, the anti-Negro subjects should have had less positive (i.e., constriction or less dilation) pupil reactions to the racial stimuli than would the equalitarian subjects. The predicted attitude group difference occurred, but only on the first of eight exposures of the pictures rather than the later exposures. Study B showed that the unexpected findings of Study A were not reliable. What Studies A and B did show was that subjects may be expected to dilate consistently on viewing racially-toned pictures, regardless of their own attitude toward Negroes.

Study C was done on the hunch that in Studies A and B we had not really produced in our subjects the same kind of intensity of affect that Hess had when he found that certain pictures were accompanied by pupillary constriction. Again, there was a failure to find anything which would encourage the use of the pupil as a bidirectional index of pleasant and unpleasant emotional states. As in the first two studies the subjects dilated whether they felt neutral or uncomfortable about the stimulus.

791. Worrall, N. Differential GSR conditioning of true and false decisions. Journal of Experimental Psychology, 1970, 86, 13-19.

A series of questions was used to demonstrate differential conditioning of the galvanic skin response (GSR) to decisions to give true or false answers to these questions. Following a mock theft, 20 personality inventory-type questions were asked, to any five of which Ss were required to give a deliberate false answer. An experimental group had shock paired with each false answer, while control groups experienced either random shock or no shock at all. The GSR under examination appeared to have two components, one occurring several seconds before the overt answer and one approximately coinciding with the answer. The experimental group showed differential conditioning in the amplitude of this response complex for true-false answers, and the effect showed transfer to specific test questions about objects possibly taken during the mock theft. Group differences were maintained in the generalization and extinction data. Results are discussed in terms of whether the paradigm is best regarded as mediational, classical, or instrumental.

Y

792. Young, P. T. Emotion in man and animal: Its nature and relation to attitude and motive. New York: Wiley, 1943.

Minor portions of this work report on such material as the relation between autonomic responses and: (1) emotionally significant words, (2) scenes designed to arouse sexual interest, anger and fear.

Z

793. Ziegler, L. H., & Cash, P. T. A study of the influence of emotions and affects on the surface temperature of the human body. American Journal of Psychiatry, 1938, 96, 677-696.

(1) A brief review of the literature is presented, including the history of factors affecting body temperature.

(2) Some surface temperature readings of twenty patients are presented. Weeping caused a noticeable change in the surface temperature of one patient. The temperature of the two sides in hemiplegics was remarkably similar. The electrothermograph of one patient, preoccupied by unpleasant aspects of her life-history, shows a sharp drop in the temperature of the right cheek.

(3) Emotional reactions appear to have an inconstant effect on surface temperature, as Pembrey had concluded. It seems fairly well established that emotions or affects may conspire to produce surface temperature deviations, variable in duration, even to the extent of fever, or outspoken hypothermia.

794. Zimbardo, P. G., Cohen, A. R., Weisenberg, M., Dworkin, L., & Firestone, I. Control of pain motivation by cognitive dissonance. Science, 1966, 151, 217-219.

Responses by humans to painful electric shocks are significantly modified at subjective, behavioral, and physiological levels by verbal manipulations of degree of choice and justification for further exposure to the aversive stimuli. Pain perception, learning, and galvanic skin resistance are altered under these conditions of "cognitive dissonance," as they are by reductions in voltage intensity.

795. Zimny, G. H., & Weidenfeller, E. W. Effects of music upon GSR of children. Child Development, 1962, 33, 891-896.

Two excerpts of musical selections, one judged to be exciting and the other to be calming, were played to kindergarten, 3rd- and 6th-grade children, while continuous GSR measures were taken. It was hypothesized that the exciting music would produce a decrease and the calming music an increase in electrical skin resistance. The hypothesis was confirmed. In comparison with college Ss and psychotics, the children were more responsive, evidenced a shorter latency and a greater magnitude of response to the exciting music, and a greater magnitude but not shorter latency to the calming music.

796. Zimny, G. H., & Weidenfeller, E. W. Effects of music upon GSR and heart rate. American Journal of Psychology, 1963, 76, 311-314.

The hypothesis was tested that the responses to three pieces of music designated as exciting, neutral, and calming exist in that order on a scale of the GSR and of heart-rate. Selected 6-minute portions of pieces by Dvorak, Chopin, and Bach that were judged by college students to be exciting, neutral, and calming, respectively, were played in counterbalanced order to each of 18 randomly selected college students. Measures of the GSR and heart-rate were taken at intervals of 15 seconds. The hypothesis was partially confirmed with respect to the GSR but not heart-rate. The GSR-response to the exciting music was a pronounced decrease in resistance (indicating increased emotional arousal), while the response to both the neutral and calming music remained unchanged throughout the playing of the music.

797. Zuckerman, M., Persky, H., & Curtis, G. C. Relationships among anxiety, depression, hostility and autonomic variables. Journal of Nervous and Mental Disease, 1968, 146, 481-487.

Describes the correlations found between interview-based ratings of affects and autonomic measures (GSR, heart and breathing) made in a cold-pressor test and blood pressure and pulse in a physical examination. Ss were 29 male psychiatric patients and 25 normal males. Spontaneous GSR fluctuations correlated with anxiety and depression ratings in the patients and combined groups. Breathing rate increase in response to the cold-pressor was higher in patients than in controls, and it tended to correlate with other anxiety measures in this group. Cardiovascular measures showed little relationship to affect measures, except for a relation in the controls between heart rate increase and depression. Factor analyses of the autonomic variables revealed the influence of the law of initial limits and individual specificity of response.

798. Zussman, C. R. Comparison of hypertensives and normotensives on behavioral aggression and sensitivity to hostile cues. (Doctoral dissertation, University of Massachusetts) Ann Arbor, Mich.: University Microfilms, 1968. No. 69-5187.

Systolic and diastolic blood pressure, heart rate, skin conductance, vasodilation and respiration rate were monitored while Ss engaged in a competitive situation involving reaction time. Subjects were led to believe they were competing against an opponent. They were told they would determine the intensity of shock their opponent would receive on a particular trial provided that they were quicker than their opponents. This was done by their making a setting on a five position switch before each trial. Subjects were informed that their competitors had the same prerogative.

At the end of each trial subjects received feedback of the intensity of shock which their opponents intended them to receive by observing which light flashed on the apparatus in front of them.

The following evening, Ss engaged in a perceptual recognition task where pictures with hostile, sexual and dependency content were tachistoscopically exposed and their recognition time noted. In the second half of this part of the experiment the stimuli were exposed at full clarification and Ss asked to rate them on a -3 to +3 scale for degree of "like" or "dislike."

Hypertensives tended to be less aggressive than Normotensives early in provocation; however, the overall difference between the groups was not significant. Although a decreasing gradient was noted from the preprovocation trial through trial 2, there were increases both at trial 3 and trial 5.

The greatest increase in blood pressure was observed between the initial screening session and the first blood pressure reading on the night of the experiment. Diastolic blood tended to increase with provocation. Hypertensives reacted to provocation with increases in respiration rate which resulted in a group x trial interaction. Decreasing gradients were noted in all other physiological indices.